

Students at IDEA Frontier College Preparatory in Brownsville, Texas, analyze images and paragraphs for an assignment in Scott Frank's history class. Frank, who uses AP U.S. History material in the course, said he feels nervous about whether the content he teaches in the class will be viewed as violating Texas' restrictions on teaching subject matter deemed controversial.

— Courtesy of Scott Frank

Curriculum

EDITOR'S NOTE

Curriculum shapes learning and is integral to student development. This Spotlight will help you explore educator perspectives on parental involvement in curriculum choices; review how curriculum can help students' media literacy; understand College Board warnings against curriculum censorship; learn how one nonprofit is partnering with schools to amplify students' problem-solving abilities; discover why teaching data science is important; and teach kids how to succeed.

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Published December 17, 2021

Majority of Educators Believe Parents Should Be Involved in Curriculum Choices

By Ileana Najarro

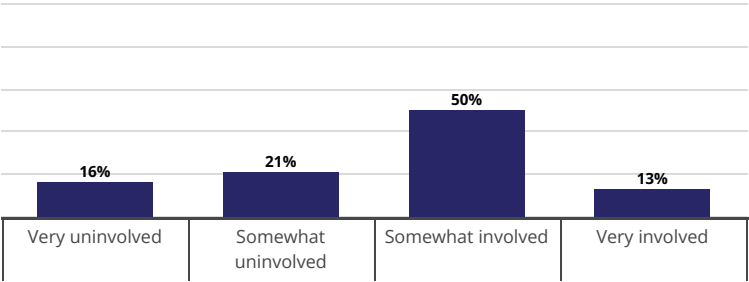
Parents across the nation are seemingly up in arms about the ways teachers talk about race, LGBTQ identities, religion, and climate change. They’re confronting school board members, recording and posting classroom lessons on social media and urging politicians to crack down on what’s allowed to be discussed in class.

How do educators feel about the issue? Last month, the EdWeek Research Center in a nationally representative survey asked more than 1,300 district leaders, school leaders, and teachers how they feel about teaching politicized topics in the classroom, and about parental involvement in choosing or weighing in on the selection of curricula and learning materials.

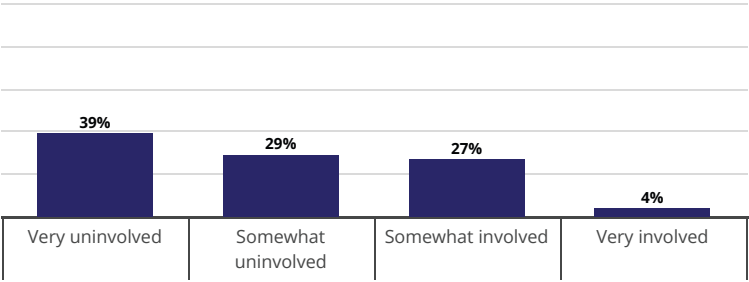
Here’s what they said. ■



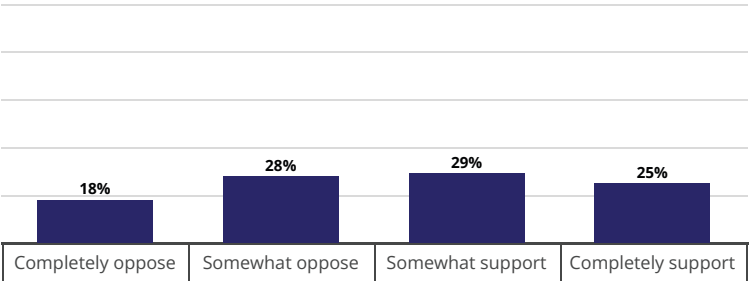
In your opinion, how involved SHOULD parents in your district or school be in selecting curriculum and materials selection in your district?



How involved are parents in your district or school in selecting curriculum and materials selection in your district?



What is your opinion of the idea of letting parents opt their children out of classes, curricula, or units they disapprove of?





—Syahrir Maulana/Getty

Published January 29, 2020

A ‘Good News’ Story: Curriculum Can Help Students Better Evaluate Online Information

By Stephen Sawchuk

It can be difficult to look at the increasing volume of online misinformation—and its consequences on our civic life—with anything other than despair.

But all is not lost. There’s a small beacon in new research concluding that students really can become more critical consumers of online information—a key skill in distinguishing legitimate news and sources of information from slickly produced ones designed to mislead.

The research, recently released by the Stanford History Education Group, is based on an empirical study of its own Civic Online Reasoning curriculum.

Key elements of the curriculum include learning to use “lateral reading,” in the mold of professional fact-checkers, by opening up multiple browser windows to cross-check the source of the information. (Students could investigate, for example, whether something they’re asked to evaluate was produced by a legitimate news outlet or by an advocacy group or other source that might raise questions about its accuracy.)

You may remember that last fall SHEG found that high school students were, in general, terrible consumers of digital information. In a previous study, it found that over half

“What you’re really looking for is the depth and the probing of people’s responses and whether they can give evidence to back up their conclusions.”

CYNDY SCHEIBE

Professor, Department of Psychology, Ithaca College

of high schoolers it tested took at face value a video purporting to show ballot-stuffing, and concluded it was strong evidence of voter fraud in U.S. elections. (The video actually showed footage from Russia.)

But in the new study, students who were taught using the SHEG materials showed growth in their ability to evaluate online sources critically of about two-and-a-half points on a 14-point scale, compared to just

over a half-point of growth in those who didn’t use the materials.

“I’ll just say we are experiencing a time of profound pessimism of our ability to do something about the rapid misinformation and disinformation that envelops us every time we turn on a device and look at the screen,” said Sam Wineburg, the founder of SHEG and an education professor at Stanford. “The idea we can move the middle with a fairly minimum investment is a finding we believe we can celebrate.”

Filling in Research Holes

One reason the study matters is that media literacy is still, all things considered, a pretty nascent field, and research is catching up, noted Cyndy Scheibe, a professor in the department of psychology at Ithaca College. She also runs a media-literacy group at the college that offers curriculum and training, Project Look Sharp. (Scheibe did not contribute to the SHEG research.)

In general, “I think the robustness of the [media literacy] research and the quality of the research varies a little bit. Some of it is qualitative in its assessment more than quantitative,” Scheibe said. “Unlike other things we measure that may be relatively easy to assess, the issue with media literacy is if what you’re trying to do is look at how people interpret media messages or analyze media messages, ... there isn’t one right answer, typically.

“What you’re really looking for is the depth and the probing of people’s responses and whether they can give evidence to back up their conclusions.”

To that point, outcomes like self-reports or multiple-choice questions don’t tend to do a good job of measuring students’ media-evaluation skills. And as my colleague Sarah Schwartz reported last year, when the RAND corporation tried to look through the literature, it found that researchers defined media literacy in different ways and there were few studies of specific teaching approaches or programs.

The SHEG research, on the other hand, tests its own curriculum, which explicitly teaches lateral reading and other skills. The study is based on a sample of about 460 high school juniors or seniors taking a civics or government class in six high schools in an unnamed midwestern district. Researchers randomly assigned half the schools to use the SHEG materials.

Teachers in the treatment schools incorporated six of the lessons into their classes, while those in the comparison high schools received their normal civics and government program-

ming. Students took a pre- and post test at either end of the semester requiring them to evaluate online sources.

Each pair of schools generally had similar demographics, and the researchers controlled for characteristics that tend to impact measures of learning.

The study also found some preliminary evidence that Black students and students who don't speak English at home did not improve as much as their peers. (The civics education community is increasingly concerned about this so-called "civics gap." Groups that have had to fight the hardest to exert their civic rights in the United States are often the least likely to be taught about their rights and the tools they can use.)

Even though the study was not done by independent researchers, Scheibe praised it for being soundly designed and an important addition to the literature. Nearly all the research focuses on high school students even though the consensus in the field is that students need to be taught media-literacy skills far earlier for it to become an automatic habit of mind.

"We have a long way to go, including how do you teach this effectively, at different grade levels, and different curriculum areas," she said. "For us, we see media literacy as literacy. And therefore you can't just start teaching it in high school—you have to start teaching it in preschool, and then every year." ■



Published March 14, 2022

College Board Warns Against Censoring Its AP Courses

By Ileana Najarro

The Advanced Placement program has long provided a stepping stone to college-level work for high school students. But as a growing number of states enact bans or restrictions on teaching about “divisive” or “controversial” topics in K-12 schools, questions are rising over how AP coursework will be impacted, particularly in subjects such as U.S. History or African American Studies, the newest course in development.

How has the College Board—the organization that runs the AP program—responded to those questions? Well, it’s complicated.

On the one hand, in a statement to Education Week on Jan. 18 the College Board says it is “not aware of any instances in which state requirements conflict with the standards of college-level AP courses.”

But on March 2, the organization sent AP teachers a reminder of program principles they must adhere to. If instruction is censored, the College Board says, students could end up losing AP credit.

The College Board sets the required teaching topics—and in some cases, the required foundational texts—for all AP courses. A school must prove that their AP courses meet these requirements to get a legal license for AP authorization of the course.

For instance, an AP U.S. Government and Politics teacher must assign the reading

of Martin Luther King Jr.’s famous “Letter From Birmingham Jail” essay, College Board says. But if that teacher chooses to omit that required text from their authorized AP U.S. Government and Politics course—be it in fear of crossing a state law limiting classroom discussions on racism, fear of parent pushback, or some other reason—the course would then lose its AP license and the AP designation would be removed from students’ transcripts.

The AP Program has an annual course audit process in which principals and teachers submit their proposed AP course syllabus for review by college professors to get AP authorization, the College Board says. In cases where required topics of authorized courses are omitted, parents, students, and educators can report it through the AP course audit help line.

While the College Board sets the required topics, it does not specify how to go about teaching them. An AP U.S. History teacher must cover the “causes and effects of the victory of the [United States] and its allies over the Axis powers in World War II,” but which leaders and battles to focus on and how to present these examples in class would be up to the teacher, the organization says.

The lingering questions on how and what to teach—such as how or whether to discuss current events in a history class to help students connect the dots between past and present—has some teachers on edge. For instance, when talking about the history of Jim Crow laws and the civil rights movement, would

“

AP students are expected to analyze different perspectives from their own, and no points on an AP Exam are awarded for agreement with a viewpoint.”

AP STATEMENT OF PRINCIPLES

it be too controversial to link it to the Black Lives Matter movement?

“I guess there’s a nervousness that I’ve never had in my 12 years of teaching,” said Scott Frank, an AP Psychology and International Baccalaureate History of the Americas teacher in Brownsville, Texas, who teaches AP U.S. History material in the latter course.

What AP stands for amid growing legislation

The College Board's latest public statement on what the AP program stands for—including its opposition to censorship and indoctrination—comes as Florida is set to become the latest state to pass what is commonly referred to as anti-critical race theory laws.

In a largely conservative push for more than year, at least 14 states have enacted bans or restrictions on how to teach topics of racism and sexism in K-12 schools and the teaching of critical race theory, an academic framework that posits that racism is systemic as opposed to only individual acts of discrimination. State officials in favor of such bills have said they are aimed at preventing teachers from telling students what to think or encouraging them to see division among racial and other groups.

Much of the College Board's AP program principles seem to address such language, emphasizing the program's focus on factual information and multiple viewpoints, and offering a defense of AP coursework.

For instance, Florida's House bill 7, championed by and expected to be signed by Gov. Ron DeSantis, would prohibit teaching in a way that would lead to students feeling "guilt, anguish, or other forms of psychological distress" because of past actions by members of the same race, sex, or national origin.

The AP's fourth principle addresses this, stating that "AP students are not required to feel certain ways about themselves or the course content. AP courses instead develop students' abilities to assess the credibility of sources, draw conclusions, and make up their own minds."

Texas' law says teachers who discuss a "particular current event or widely debated and currently controversial issue of public policy or social affairs... shall, to the best of the teacher's ability, strive to explore the topic from diverse and contending perspectives without giving deference to any one perspective."

The AP statement of principles says "AP students are expected to analyze different perspectives from their own, and no points on an AP Exam are awarded for agreement with a viewpoint." It adds that "the perspectives and contributions of the full range of AP students are sought and considered."

The AP principles also emphasize how course requirements and sample tests are available to the public; how parents and students freely choose to enroll in AP courses, and how AP courses are rooted in presenting students with facts, from which they can draw their own conclusions.

Additionally, the College Board said "the

Sample text of AP principles	Sample text of education bills/bans
The AP program "makes public its course frameworks and sample assessments."	Virginia governor's executive order: Superintendent of public instruction must "ensure that parents are empowered with open access to information on primary instructional materials utilized in any school."
"AP courses enable students to develop as independent thinkers and to draw their own conclusions. Evidence and the scientific method are the starting place for conversations in AP courses."	North Dakota HB1508: "Each school district and public school shall ensure instruction of its curriculum is factual, objective, and aligned to the kindergarten through grade [12] state content standards."
"AP students are expected to analyze different perspectives from their own, and no points on an AP Exam are awarded for agreement with a viewpoint."	Texas HB3979: Teachers who discuss a "particular current event or widely debated and currently controversial issue of public policy or social affairs... shall, to the best of the teacher's ability, strive to explore the topic from diverse and contending perspectives without giving deference to any one perspective."
"AP students are not required to feel certain ways about themselves or the course content."	Florida HB7: Prohibits instruction that makes students believe they must "feel guilt, anguish, or other forms of psychological distress" because of past actions by members of the "same race, color national origin or sex."
"Students are encouraged to evaluate arguments but not one another. Respectful debate of ideas is cultivated and protected; personal attacks have no place in AP."	New Hampshire HB2: Prohibits teaching students "that one's age, sex, gender identity, sexual orientation, race, creed, color, marital status, familial status, mental or physical disability, religion or national origin is inherently superior to people of another age, sex, gender identity, sexual orientation, race, creed, color, marital status, familial status, mental or physical disability, religion, or national origin."

AP program convenes scholars committed to nonpartisan content to develop politically balanced AP course frameworks."

In AP U.S. History, for instance, students must cover the topics of immigration and migration in the Gilded Age as well as responses to immigration during that time period, the failure of Reconstruction, and the civil rights movement,

as well as World War II and the Declaration of Independence, among many other topics.

Where teachers stand

While the new Florida bill speaks to avoiding student discomfort in discussing the country's racist past, Michele Mar, an AP U.S.

History teacher at the School for Advanced Studies North Campus high school at Miami Dade College, said in her more than 30 years of teaching, including several years in the AP course, she has never had a student come forward to say something taught in class offended them or caused discomfort.

Her class, which has many students with parents from other countries, does delve into moments of U.S. history that can at times shock her students. Two examples are the Chinese Exclusion Act and Japanese American concentration camps, she said.

Mar, who was part of the national cohort of teachers who worked with the College Board to record lesson videos during remote learning as an extra resource for teachers and students, said the frameworks the board created for the course are comprehensive so that even though students don't get a lot of time to dig deeply into every topic, they walk away with a broad understanding of American history beginning roughly around 1491 through the present.

Mar said she's not worried about needing to change how she teaches her course after the new state legislation since she sticks to facts,

not opinions—partly because she has less than a year to cover a dense amount of material with students whose priority is to pass an exam to get college credit.

"I don't go into my opinion," Mar said. "We look at [primary and secondary historical] documents, look at facts, we look at what has been said. We look at past stories."

Frank, in Texas, is also staying the course in terms of how he teaches U.S. history to his students.

Yet with the passage of the Texas law last year banning schools from, among other things, requiring teachers to discuss controversial issues, Frank worries that a student could misinterpret something he said or someone could walk in and misconstrue a classroom discussion of current events linked to history.

He said he sees his job at IDEA Frontier College Preparatory in Brownsville, Texas, as preparing students to be critical thinkers in and out of school, which involves connecting history lessons to current events. But now he's anxious over whether a current event is too controversial to discuss in class, and if he should avoid it altogether.

When teaching about the past, he gives students multiple lenses. For instance, when teaching about the Era of Good Feelings in the United States following the War of 1812, he had students contemplate what that time was like for industrialists versus a poor farmer out West or someone who was enslaved.

He's delved into topics like lynchings, the Trail of Tears, the Vietnam War and so on. And when he does so, he has found his students don't express hatred or discomfort with the country.

"When you're honest with the things that are not very pleasant, and you have a conversation, and you read the literature and look at the primary sources, you have students that come around to loving this country even more, because of what it's been through," he said. "It's like that crucible. You've been tested through this."

His hope is that more conversations rooted in historical evidence can happen in classrooms across the country. His fear is that the growing number of bills and laws will intimidate teachers to avoid helping students learn how to connect the dots between the past and present. ■

Published May 3, 2022

Want Students to Become Better Problem Solvers? Then Teach Them To Fly Planes and Drones

By Kevin Bushweller

Pairs of Magruder High School freshmen are gathered at the controls of eight Redbird flight simulators, high-tech machinery with foot pedals and control panels that are used to train private and professional pilots how to take off, land, and maneuver aircraft safely under normal and dangerous circumstances.

The students in the second-floor classroom—some wearing COVID masks and others choosing not to—are all getting a taste of the thrill and potential dangers of piloting an airplane. The computer keyboards for the FAA-approved simulators feature red, green, blue, orange, and brown function keys for activating experiences such as flying in zero visibility, with a failed engine, or on autopilot. One student is approaching an airport for a landing, but veers sideways across the run-



Magruder students get a lesson on mechanical work in the aviation industry during a field trip to the Montgomery County Airpark.

— Jaclyn Borowski/Education Week

way. Another applies too much power when taking off, flying up at an awkward, problematic angle.

In the years ahead, these 9th graders will learn the principles of flying airplanes and drones; tackle mathematical and engineering analyses around concepts such as torque, force, weight, distance, and altitude; learn how dead or malfunctioning batteries can unleash “runaway” drones; and investigate the possible causes of an airplane crash and how it could have been prevented.

One 9th grader, Eleanor Kim, is not sure what career she eventually will choose as an adult, but she is seriously considering something in the aviation industry. “I want to try this out,” she said. “It gives us a great plan for the future and future job options.”

The free and relatively new curriculum—designed by the nonprofit Aircraft Owners and Pilots Association (AOPA) Foundation and used mostly in high school career and technical education programs—is spreading quickly across the country, growing from use in 29 schools in 17 states in 2017-18 to 322 schools in 44 states for the 2021-22 school year. Forty percent of the kids in the program are students of color and 21 percent are females.

The surge in interest is fueled largely by growing opportunities in the airline industry, which faces massive shortages of pilots, mechanics, and other jobs due to retirements and the domestic and international expansion strategies of many airlines.

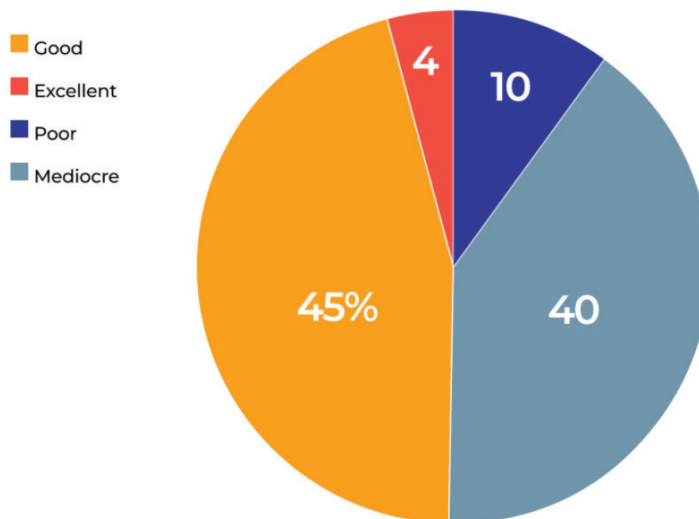
The industry is also struggling to build a roster of pilots that features more women and people of color. Currently, only about 5 percent of aircraft pilots and flight engineers are women, 4 percent are Black, 2 percent are Asian, and 6 percent are Hispanic, according to U.S. Bureau of Labor Statistics.

“Women and people of different ethnicities, they bring a different perspective, a different energy,” said Tammie Jo Shults, a former Navy and Southwest Airlines pilot and author of *Nerves of Steel*, which recounts the problem-solving skills she put into action to safely land a Boeing 737 when it blew an engine at 32,000 feet. “We are not needed in the industry to make it fair. We’re needed in the industry because when you mix all those groups together, you get a higher IQ. You get better innovation.”

Brad Morrison, manager of pilot recruiting and development for American Airlines, said roughly half of his airline’s pilots are scheduled to retire within the next seven years and American needs to hire 2,400 pilots this year alone. There is also a big demand for airplane

EXCLUSIVE DATA

How would you rate the math and science problem-solving skills of the students in your classroom (teachers), school (principals), or district (district leaders)?



SOURCE: EdWeek Research Center survey, 2022

EdWeek
Research Center

mechanics and other jobs, he added.

“What I tell kids now,” Morrison said, “is this is how I wish the industry would have been 20 years ago” when he was thinking of pursuing a career as a pilot. There are way more opportunities now to enter the airline industry in a variety of careers and get promoted quickly, he said.

Solving real-world problems: Investigating the cause of a plane crash

Ayman Bustillos, a Magruder senior who plans to study aerospace engineering at Embry-Riddle Aeronautical University in Daytona Beach, Fla., next year, has been in the AOPA program for four years. He said one of the most powerful and memorable problem-solving lessons he learned in high school happened when he was asked to investigate the cause of a catastrophic jet airplane crash. “That helped me in my decision to become an aerospace engineer,” he said.

The plane crash lesson—which is part of the curriculum—had Ayman and four other

students work as a team to investigate why the plane crashed as it approached the runway. Ayman’s responsibility was to investigate the specifications of the airplane, its engines and its age; a second team member had to evaluate the quality of communications between the pilots and the air traffic control operators; a third, the weather conditions during takeoff, in flight, and on the landing approach; a fourth was tasked with pulling together all the data from the aftermath of the crash; and the last team member had to review previous airplane crashes to determine if there were lessons learned from those accidents that could be applied to this one.

“The whole point of the exercise was to work on a team and combine each other’s strengths,” said Ayman, who noted that the team’s final conclusion was that pilot error caused the crash.

Victoria Wentt, a recent Magruder graduate who is now attending a local community college, is working toward earning her private pilot’s certificate and hopes to one day fly for one of the major commercial airlines. She too found the opportunity to tackle a real-world



"The current support for integrating the arts and core academic curriculum is more significant than I've witnessed in my career. **We are seeing a new paradigm where the arts lead the other academic areas to meet the whole child's needs.**"

Dr. Betty Hill, Supervisor of the Arts (Columbus City Schools)

"The Arts Lead the Core"

Dr. Betty Hill oversees an initiative at Columbus City Schools that focuses on developing innovative, relevant, and rewarding learning experiences that enable the skills and mindsets needed for the development of the whole child, including the arts.

"Integration of traditional academic learning and the arts are important to the educational development of students," says Dr. Hill. "It is essential to speak to our student's needs, understand what is important to them, what's relevant and rewarding, and engage that in educational spaces. The Guardrails for the Whole Child demonstrate the support of the initiative from the Board to the classroom."

Dr. Hill also ensures that the new curriculum is inclusive and culturally responsive, integrating additional support for English Language Learners and the LGBTQ+ community. "We want to be inclusive of all students as we develop curriculum and resources. It is important to be inclusive and provide equitable access for all".

The curriculum will also address the growing need for social-emotional learning (SEL).

According to Dr. Hill, "It is equally important to speak to our student's social and emotional development and understand that the arts are uniquely positioned to do just that."

She has seen the importance of integration of traditional academic learning and the arts to support student well-being post-pandemic when a dance group who hadn't been together for an entire year returned for their final concert and produced a documentary on the experience. "We interviewed the students to talk about what it meant to them. It spoke to their state of mind and emotions. I cried through the entire thing," admits Dr. Hill. "It was beautiful, and it helps you understand why it is so important to enable students' engagement in the arts. For some of them, the only way they could express themselves was to get up on the stage and perform, and it came out of every pore of their body."



Portrait of a Graduate

This strategic overhaul of the curriculum to refocus on the whole child stems from the district's larger initiative of painting a Portrait of a Graduate. CCS worked with more than 150 internal and external stakeholders with diverse perspectives to identify six key attributes. These attributes: Adaptability, Communication, Creativity, Critical Thinking, Global Empathy, and Technology, aim to prepare students for life beyond the classroom.

CCS has also identified four strategic priorities, each with individual goals and objectives, that will guide the various teams and stakeholders over the next five years to support the district's integration of traditional academic learning and the arts, mission, vision, and Portrait of a Graduate.

To effectively paint the Portrait of a Graduate, Dr. Hill's critical role in this initiative was to oversee the development of the curriculum writing and report on the progress pertaining to the implementation of the arts aligned to the six key attributes. "We have 7 to 8 meetings per week with curriculum writers and pilot teams," says Dr. Hill.

The District piloted the PreK-5 curriculum in 5 of its 75 elementary schools in December 2021. In January 2022, a diverse team of 30 curriculum writers began to develop the content for grades 6-12.

"The District will implement a similar curricular model, however, with an increased focus on embedded technology, internships, community partnerships, and project-based learning," explains Dr. Hill. "In addition, the writing team is tasked with completing a pilot model for implementation in the Fall of 2022-2023. The PreK-5 writing team is in Phase II of their project and completing the needed content for the full implementation in the Fall, which will have embedded technology."

Technology is 21st Century Art

"Extensions of this curricular initiative include embedded and emerging technology," shares Dr. Hill. "Traditionally, in the arts curriculum, reference to technology was an entity in itself. However, with the district's strategic plan enabling equitable access, we are embedding technology into the curriculum and focusing on more profound learning experiences including technology versus the focus on technological devices."

As the District continues to phase in the curriculum, Dr. Hill has ensured that some technology pieces are already in place, including 1:1 devices for all students and providing all 4th graders with the music program Soundtrap for when they begin their instrumental unit. "Technology was an elusive instructional tool in arts classrooms, that thing that we never had. We had our traditional tools but little technology."

The implementation of Soundtrap has moved into the middle and high school traditional academic classes, opening up doors for students in a whole new way, allowing technology to truly become an art in CCS.

"Engagement Like We've Never Seen Before – Integration of traditional academic learning and the arts"

When you implement the arts, particularly technology, into the curriculum, the student outcome becomes more than just grades and accountability; it becomes ownership of a piece of art. Dr. Hill shares that when Soundtrap was first implemented at the high school level, the response was incredibly positive "because we started seeing engagement at a level that we had never seen before."

Instead of avoiding classes, Dr. Hill states, "Now students are coming to the classroom with music they have created with their 1:1 device. They work on it at home and bring it to class to share with their teacher saying, 'Listen to this.'"

This engagement doesn't stop in the classroom. Through Soundtrap, Dr. Hill was given the thumbs up to move ahead with implementing the development of a curriculum to support a student-led radio station.

"That is an innovative piece," she says. "The District is developing a student-led radio broadcasting station that integrates pre-K through 12 curricular pathways focused on the Portrait of a Graduate attributes. We have an entire building that will focus on that."

This innovation, this 21st-century thinking with arts leading the way through a whole-child approach, will set CCS apart from other districts as the world continues to move into a creative technological future. "If we're going to enable students to be competitive when they leave our walls, or even while with us, we have to do this," adds Dr. Hill. "I'm excited at this point in my career to see that we've created this visibility for the arts that will help all of our students excel."

Dan Howell, a Magruder aviation and technology teacher, leads a lesson on the importance of understanding how batteries work, and can fail, when flying drones.

problem like a plane crash much more meaningful than what she learned in most of her other classes in high school.

“We were the problem solvers,” said Wentt, who would be among a tiny percentage of Black female commercial airline pilots if she achieves her professional goal. “We had to figure out what happened and why it happened. We all learn off of other people’s mistakes. But in a plane crash scenario, you do not want to be the one making the mistake yourself.”

Despite the largely positive experience Ayman and Wentt had in the program, he suggested there is room for improvement. “The biggest flaw of the program was the lack of direct instruction,” he said. “Most of the time, you can do your own thing.”

That works well for highly motivated students like him, he said. But without enough direct supervision, others don’t take the work “as seriously as they’re supposed to.”

Luke Moitoza and Byron Barksdale are very serious about flying.

On this April morning, in their second period AOPA class, the two sophomores use plastic parts, wood pieces, tape, and rubber bands to build a miniature helicopter—an exercise to teach them about torque (a twisting force that prompts rotation) and how the rotor system of a helicopter affects its motion.

But after putting the tiny flying machine together, they twist the rubber band too tightly. When they let it go to see if it will fly properly, it shoots up like a rocket and smashes into the high ceiling in the Magruder classroom, the helicopter crashing to the floor after leaving one of its key propeller components embedded in the ceiling.

Byron, a high school baseball player wearing his blue and gray Magruder team jersey that day, eyes a tennis ball on his table, holds it in his hand for a moment, then throws it underhand at the ceiling, hitting a spot perfectly to make the purple helicopter part pop out of the ceiling and drop down. Cheers and laughter follow.

Then the two are right back at it, trying to put the helicopter back together, focused and serious with Moitoza wearing a black COVID mask and Barksdale maskless.

Moitoza, a 16-year-old with a military short haircut, received a \$10,000 scholarship from AOPA to take flight lessons and is in the Civil Air Patrol. He plans to join the U.S. Air Force



— Jaclyn Borowski/Education Week

after college and hopes one day to fly B-21 bombers. Byron is thinking about entering the military to fly cargo planes.

In pursuit of his private pilot’s certificate, Moitoza did a solo flight in Winchester, Va., last fall, and a three-hour flight and night flight with an instructor. He is on track to get his pilot’s certificate when he turns 17.

‘The new frontier of flying’: Learning about drones

The AOPA curriculum has two tracks that students decide to take when they are juniors—the regular pilot pathway or the drone track. Because he has already learned a lot of the regular pilot skills on his own, Moitoza plans to enter the drone track because he wants to be licensed to fly both planes and drones. “That’s the new frontier of flying,” he said.

In a little more than a year, the number of FAA-licensed drone pilots in the United States increased from about 206,000 to more than 273,000, according to Glenn Ponas, the AOPA Foundation’s director of high school outreach and a former aviation teacher and district administrator for the Pittsburgh public schools.

But one of the hurdles for the Magruder program is getting approval from the county government to fly drones—either in a protected area inside the school building or outside on school property. School officials are working on making that happen. What complicates matters is

the school is located close to Washington, D.C., which has some of the most-restricted air space in the country to fly regular planes or drones.

Natalie Webb, a junior in the program’s drone pathway, says it has taught her important problem-solving skills such as collaboration that are often absent in her other academic classes. She said having the opportunity to fly drones under the supervision of teachers would make the program even better. She hopes the school gets that approval before she graduates next year.

A 16-year-old competitive swimmer, Webb does not want to be a professional pilot of planes or drones. But she is now seriously considering a business management career in aviation because of the industry’s expanding opportunities.

That is music to the ears of Erik Yates, the AOPA Foundation’s director of curriculum development and a former public and international school teacher and STEM supervisor for 25 years, given that some career and technical education programs are often criticized for funneling students into narrow career pathways with few options to move in other directions. “If you can imagine a job, it’s in the airline industry,” he said, rattling off a bunch of non-pilot careers such as human resource management.

‘Flying does involve certain risks’

On a cold, drizzly afternoon in April, Yates is in an airplane hangar at the Montgomery County Airpark in Maryland, giving a pre-



— Jaclyn Borowski/Education Week

Some students in the Magruder aviation program are taking flying lessons and are on track to earn their private pilot certificates.

sensation about the aviation industry and the myths surrounding it to a group of sophomores, including Luke and Byron. He occasionally pauses his presentation to accommodate the roar of charter jets or prop airplanes taxiing for a takeoff or coming in after a landing, and some kids turn to watch the planes.

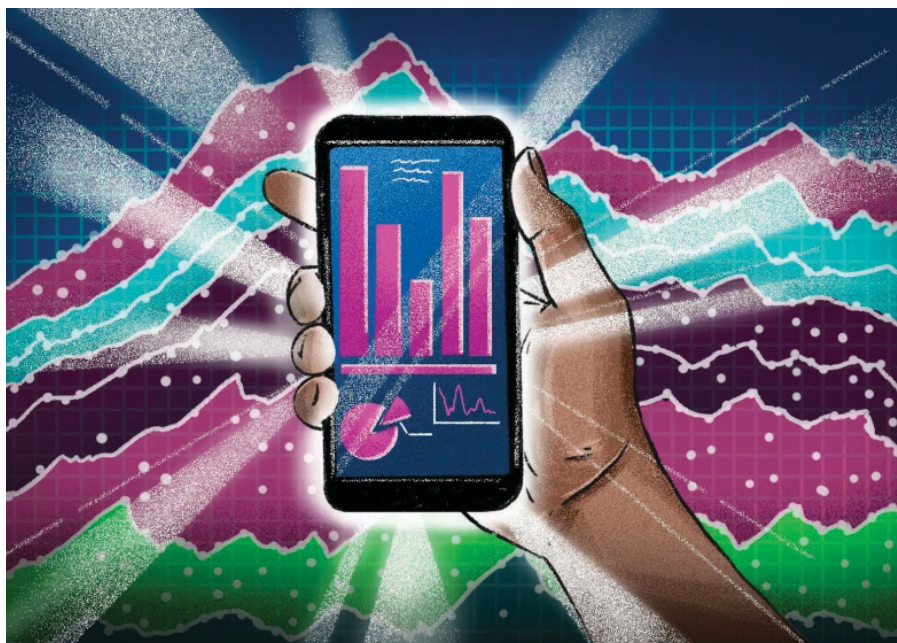
Earlier that morning, the students had the opportunity to climb inside a charter jet and examine the cockpit, talk to current and retired airline pilots, and see how airplane mechanics work. The two mechanics working on this day are women.

When the din of the airplanes is far from the hangar, Yates talks to the students about US Airways Flight 1549, which hit a flock of birds after taking off on Jan. 15, 2009, from New York City's La Guardia Airport and then lost all engine power. Yates told the students that the jet airplane's captain, Chesley "Sully" Sullenberger, used problem-solving skills he had learned flying glider planes when he was younger to carefully guide the plane safely onto the Hudson River.

That story eventually led to a slide Yates showed on a large screen to the students about one of the myths about the airline industry: It is too dangerous. He pointed out that it is much safer to fly than to drive a car. (A few years ago, the National Safety Council compiled an odds-of-dying table, showing that the chances of dying in a motor vehicle accident to be 1 in 101 for a lifetime—for commercial airline flying and private flights, it concluded there were too few deaths to calculate lifetime odds.)

"We don't hide from the fact that flying does involve certain risks," he said in a follow-up interview. "But riding a horse involves certain risks, too."

Luke weighed those risks before he took his first solo flight. But once the plane left the runway and took off toward the sky, he looked out the window and saw a passenger jet flying high above him, and he remembers thinking: "I've got this. This is why I'm flying." ■



— Ben Currie for Education Week

OPINION

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Data Science Is the Future. Let's Start Teaching It

By Steven D. Levitt

As the coronavirus has infected millions of Americans, the news media have become saturated with numbers: new infection cases, hospitalization rates, death tolls, and vaccine trial results. Many Americans have been overwhelmed, and in part because too few of us are comfortable with data, we have been susceptible to a plague of misinformation.

Most Americans don't have the skills and knowledge to work with data, despite their critical importance to understanding our world and making informed decisions. This data illiteracy must change, and our education system needs to prioritize data-science education for all students.

Technically speaking, data science is nothing new. Scientists, businesses, and governments have long collected and interpreted data and used it as a basis for decisionmaking. But two recent changes have made data science much more relevant to all of us. The first is an explosion in the

availability of data, fed by smartphones and the internet. The second is a dramatic improvement in the quality of software tools for analyzing that data.

Despite being commonly misunderstood as a skill relevant only to technical roles, the rise of data science has had huge impacts in almost every field, from football to art history. This sea change presents many opportunities, and skills in analyzing and interpreting data can give young people access to new career opportunities. The employment-information website Glassdoor, for example, ranked "data scientist" as the second best job for 2021 based on openings, compensation, and job satisfaction. Even for those who don't pursue data science as a career, many, many working adults—nurses, salespeople, journalists—need data skills.

More importantly, data use is a practical skill that makes education more relevant. When I wrote *Freakonomics*, I employed data to explore topics as diverse as sumo wrestling, real estate, and the drug trade. Similarly, educators can engage students by having them analyze data on topics that in-

terest them like crime, the border crisis, global development, or climate change.

In many ways, this is a plea for educational pragmatism. Our world has been revolutionized by information technology, yet our K-12 curriculum is still trapped in the industrial age. Instead of teaching our young people obscure trigonometric techniques, let's help them learn how to interpret the huge amounts of data being produced every day in our hyperconnected world.

So what needs to be done? Reforms should continue along a number of tracks. First, education policymakers at the state and district levels can modernize the curriculum in mathematics and other disciplines, especially in high schools, to stress data science and computational fluency; a dozen states are already starting that work. Second, universities need to change their admissions policies to accept data-science coursework as evidence of rigorous mathematics preparation. Third, federal and state policymakers should increase funding to equip educators with the tools and training necessary to teach this material effectively.

There are already signs of progress. Some organizations, like CourseKata and Bootstrap, are exposing students to powerful tools for data analysis and equipping them with the

skills to do real analysis and report on their findings. CourseKata has developed a full data-science course curriculum, and Bootstrap offers flexible modules that can be incorporated across disciplines. The U.S. Department of Education's Institute of Education Sciences is helping to spur change by including data-science efforts in its grantmaking.

But much more needs to be done, which is why my team at the University of Chicago's Center for Radical Innovation for Social Change launched the Data Science for Everyone Coalition to mobilize and convene an active community, spark policy reform, and expand access to resources that will catalyze the expansion of data-science education in K-12 schools. In the next two years, the coalition expects to grow to 3,000 members, including teachers, parents, administrators, and policymakers.

At its heart, this is a grassroots campaign. That means engaging parents at the local level about the importance of learning data science—and connecting with educators in schools across the country, who need more support in teaching data science. So far, members of the coalition have posted some important victories.

Coalition members are already increasing access to high-quality data-science education.

For instance, the San Diego school district has committed to rolling out data-science education across P-12 by 2023, which will impact 120,000 students across 168 schools. The District of Columbia school system is partnering with American University to offer teacher training at the undergraduate and graduate levels. The Stanford Graduate School of Education's teacher education program (known as STEP) is launching a new preservice teacher education course on teaching high school data science that is responsive to multiple disciplines. And companies like DataCamp, which provides data-science instruction online, and Tableau, an analytics platform, are offering their software for free to teachers and students.

These organizations are bravely pioneering a new data-based math future, and we all need to fully commit the resources required to make it happen. Let's build a math curriculum together that engages students more fully, prepares them for successful careers, and equips them to be good citizens. ■

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OPINION

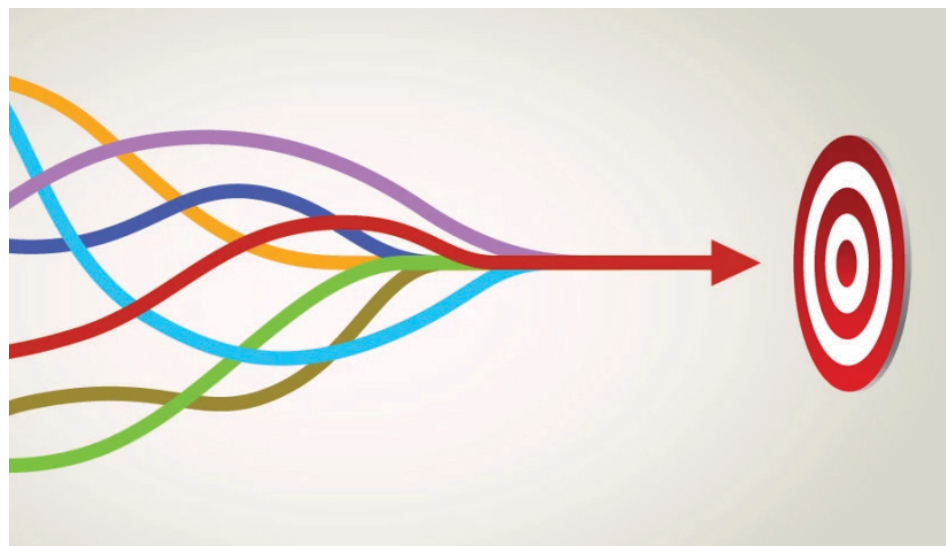
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The Evidence-Based, Broadly Appealing Way to Teach Kids How to Succeed

By Rick Hess

A question that's loomed large in debates over civics, history, and what's been labeled "critical race theory" is whether there are still shared values that unite Americans on the left and right. After all, while we all say we want schools to help students grow into virtuous and responsible citizens, it's not clear we agree on what that actually means. And while debates over these things can fill the media feed, it doesn't necessarily leave school leaders or policymakers with an idea of how to move forward.

As it turns out, though, there's at least one place where polling suggests broad, substantial support for an idea with a pretty compelling track record: the success sequence. AEI's Sur-



— Digital Vision Vectors/Getty

vey Center on American Life and my AEI education colleague Nat Malkus (remember that I'm a scholar at AEI) in August asked a nationally representative sample of 2,652 adults, with an oversample of 610 parents with children younger than 18, if they think public schools should teach students "that young people who get at least a high school degree, have a job and get married—before having children—are more likely to be financially secure and to avoid poverty"—in other words, the "success sequence." More than 3 in 4 respondents say they want public schools to teach this. (From here on, for simplicity's sake, I'll refer to the survey center's wording as the "success sequence" when discussing the poll results.)

Now, one might imagine that support for teaching such a pathway would be intuitive. As the Brookings Institution's Ron Haskins—who, along with Isabel Sawhill, first coined the term "success sequence" a number of years ago—has explained, "Of American adults who followed these three simple rules, only about 2 percent are in poverty."

But I've found that when the success sequence comes up in conversation, many academics and education advocates push back pretty hard. Some critics, such as Philip Cohen, a

professor of sociology at the University of Maryland, argue that the "success sequence is bad public policy" as it "rests on assumptions about the future" that "the target population" can't make. Others worry that it stigmatizes kids and parents in households that haven't abided by the sequence. And still others think that "the success sequence, trustworthy as it may sound, conveniently frames structural inequalities as matters of individual choice." (Those pushing back have generally lived out the sequence themselves, which raises some thorny questions.)

Yet, no one is suggesting that following the success sequence is a magical palliative to keep kids from poverty. Nor is anyone implying that adhering to it is as easy as 1-2-3—after all, getting a job requires a willing employer, and getting married requires a willing spouse. What does seem apparent is that the sequence offers a useful, sensible set of guidelines, ones that it would seem like a no-brainer to share with students.

And, as the AEI polling shows, the general public seems to agree—as do parents, of whom 76 percent support teaching the success sequence. And the approval is broad-based. More than 70 percent of Democrats say they favor teaching the success sequence, with just 18 per-

cent opposed. Among Republicans, the split is similar, at 85 percent to 15 percent. Self-identified liberals are net positive by 40 percentage points; self-described conservatives by 70 percent. Sixty-nine percent of millennials support it, as do 83 percent of baby boomers and 90 percent of the Silent Generation. And backing cuts across racial and ethnic groups, with 68 percent of Black non-Hispanic respondents, 80 percent of white respondents, and 74 percent of Hispanic respondents supportive.

The nation has been talking intently in the last few years, as it should be, about opportunity, equality, and the role of systemic impediments. That's all to the good. But we need to focus not only on the structures and externalities that can shape students' lives but also on what students can do to control their own destinies. The success sequence is a compelling, evidence-based, broadly appealing way to do both. In our intensely polarized age, it provides a promising path to talk about opportunity, impediments, and responsibility in a way that may help to span some of our bitter divides. ■

Rick Hess is a resident scholar at the American Enterprise Institute and the director of the think tank's Education Policy Studies.

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