

implementation plan and have little support within the STEM education community.”

On-the-job training

White House officials, including OMB and Stack, aren't publicly saying what they think of such rebukes. Indeed, after spending her entire career inside the federal bureaucracy, Stack knows that civil servants aren't even supposed to make policy. Yet, she has played an outsized role by focusing on how to make the wheels of government turn more smoothly.

“There are policy folks who come in from administration to administration who have great ideas, but they have no idea how government works,” she told Schatz, the artist. “I understand the culture and tools, and I know how to translate into action the big visionary ideas that political officials have.”

Those who have worked with Stack testify to her extraordinary grasp of the levers of power. “Kathy taught me, rather than the other way around,” says Gordon, a political appointee with extensive experience in Democratic policymaking circles. Jon Baron, whose nonprofit Coalition for Evidence-Based Policy conducted an evaluation of STEM education programs during the Bush administration,

says that Stack “has been very successful in persuading her political bosses” that rigorous evaluation should be part of policymaking.

Colleagues say it helps that Stack doesn't have her own agenda. “She's tied for the least ideological person in government that I

“I understand the culture and tools, and I know how to translate into action the big visionary ideas that political officials have.”

—Kathryn Stack

know,” says Robert Granger, retiring president of the William T. Grant Foundation. Granger had frequent interactions with Stack when he chaired the National Board for Education Sciences within the Department of Education during the Bush administration. “Instead, she's a terrific public servant who's motivated by what she thinks will help the government spend its money well to help kids.” Baron struck a similar chord when he told the SREE

audience that “we should be glad that she uses her powers for good, and not evil.”

Stack arrived in Washington in 1978 with an undergraduate degree in government from Cornell University to work on education issues within the former Department of Health, Education, and Welfare. In 1982, she moved to OMB and began promoting the idea of using program evaluation to shape policy in education and income assistance programs.

The tide of evidence-based policy was coming in as Stack toiled away at OMB, and she rode the wave. One result: In 1993, Congress passed the Government Performance and Results Act as part of a Clinton-era campaign to “reinvent government.” And Stack played a leading role in a similar initiative under George W. Bush known as PART (Program Assessment Rating Tool).

Then, in 2007, Congress passed and President Bush signed the America COMPETES Act, which sought to boost innovation by increasing federal support for research and improving STEM education. One of its provisions called on the government to evaluate existing STEM education programs. Stack asked Baron's center to conduct a review

NIH Teaching Units, Cherished In Schools, May Be Shredded

Two miles north of its Bethesda, Maryland, campus, the National Institutes of Health (NIH) operates a supply warehouse that serves its intramural scientists. The tidy blue and white building stands out along a grimy commercial strip dotted with auto repair shops. And so do its contents: One corner of the warehouse holds what is arguably the finest collection of health science education materials in the world. But the 180 tons of lessons may soon be pulped by a local recycling company rather than used to feed hungry minds.

Since 1994, NIH's Office of Science Education has created lessons covering 19 topics incorporating the latest biomedical discoveries. Designed to appeal to middle and high school students, there's a neurobiology unit that focuses on addiction, for example, and an exploration of biological rhythms that discusses sleep disorders.

Over the years, NIH has distributed more than 450,000 copies of the supplements, free of charge. Although the 2-week units are also available online, the office maintains some 200,000 copies for teachers—probably the vast majority—who might have trouble downloading and copying them at school.

That supply is now in jeopardy, however, as a result of a government-wide restructuring of science education programs (see main story, p. 338). The White House has proposed shutting down NIH's \$4-million-a-year education office next year and ending a \$15-million-a-year grants program that supports informal science education activities outside the regular classroom. Without a budget, the office won't be able to pay its share of the rent

and utilities for the warehouse, and the material could simply be tossed.

The moves could happen as soon as 1 October, the first day of the 2014 fiscal year. NIH officials have refused to allow Bruce Fuchs, an immunologist who has directed the office since 1996, to speak with the media. But outside scientists funded by the grants program and others familiar with the office say that its nine full-time employees have been told they will be reassigned and that contract staff members will be let go.

NIH is keeping its cards close to the vest. “We have not made a final decision about whether the office is closing at the end of fiscal 2013,” says Principal Deputy NIH Director Lawrence Tabak. But he acknowledges that NIH is considering all manner of cost-saving options because of the \$1.5 billion bite taken out of the agency's overall \$30 billion budget by the government-wide cuts known as the sequester. “We have to think about our priorities and see what rises to the top,” he says.

Teachers and health science educators around the country say that closing the office would be a tragedy. For the past decade, Jodie Spitze has taught an NIH unit on bioethics to her biology students at Kent-Meridian High School outside Seattle, Washington. She says that the NIH materials fill a big gap. In addition to providing teachers with the latest research results, the units also prepare them to lead classroom discussions of hot-button issues.

“IB [International Baccalaureate] biology has a requirement to teach controversial issues like stem cell research, but there's no strategy to do it,” says Spitze, who was featured in a 2008 *Science* article on teaching bioethics in school. Teaching kids how to listen and build a convincing argument based on facts rather than opinions “can be even more important sometimes than the content,” she adds. “Otherwise, the kids with the strongest opinions wind up dominating the discussion, which just turns into a debate.”

that found only 10 of the 115 existing STEM programs had been rigorously evaluated. Of those, only four were found to have achieved their goals, which included raising student achievement in science and math, improving the skills of STEM teachers, attracting more students into STEM careers, and increasing public understanding of science.

Correcting “bad habits”

Stack doesn't claim to be an expert in STEM education. “My education credentials are probably at the bottom,” she told her SREE audience. But when the new Obama administration decided to apply evidence-based policy to STEM education, she dove in. “When Obama came in, we moved into overdrive,” Stack said. “Within weeks of taking office, they wanted a briefing from OMB on what we could do to improve government. I had learned from my STEM experience that there wasn't a lot of good evaluation out there.”

Although neither a scientist nor an educator, Stack was invited to speak to the President's Council of Advisors on Science and Technology (PCAST) in October 2009 as it prepared to launch the first of two studies of ways to improve U.S. science and math education. Stack used the opportunity to explain the rationale behind evidence-based policy.

“We have gotten into some really bad habits,” she told PCAST. “We don't challenge our assumptions that existing programs work. We plan evaluations once the programs have been up and running, when it's hard to create an experimental design with a control group. And evaluation officials are rarely part of the discussion when policymakers examine programs.” Although Stack said many agencies may not be able to conduct such high-quality evaluations, she told PCAST that “STEM is one area that may be ripest for taking this approach.”

Stack and her OMB colleagues decided to offer federal agencies the carrot of additional funding if they teamed up to design STEM education programs that could be evaluated more rigorously. “We said you can have money if you send us proposals to support [certain] research questions and to build capacity” for further evaluation. She said NSF and the Education Department, for example, were “challenged . . . to come up with a plan to improve teacher professional development.”

But money for those and other evaluation experiments dried up after the Republicans took control of the House of Representatives in January 2011 and the president and Congress struck a deal in August to reduce the federal deficit by cutting spending. “As pas-

sionate as I am about rigorous evaluation,” Stack told SREE, “it will be a hard sell to set aside large pots of money for evaluation.” Instead, she suggested agencies look for “natural experiments . . . that might show where they can cut without hurting student performance.”

It is not clear whether the plan crafted by Stack and others at OMB was adjusted before being rolled out by the White House. But its hostile reception suggests that, whatever the plan's technical merits, the Obama administration has done a poor job of selling it politically. The result has been widespread criticism from a research community that has generally applauded this White House's science initiatives.

In a time when every government program is on the chopping block, advocates of STEM education don't expect politicians to exempt their field from scrutiny. But the take-home message from the reorganization controversy, they say, is that politicians should rely on scientists and educators as well as bureaucrats to decide which STEM education programs live and die.

Kathy Stack wouldn't disagree. But her career demonstrates that a faceless bureaucrat can sometimes also be a very powerful voice in setting policy. —JEFFREY MERVIS

Jeanne Chowning, who leads a Seattle-based non-profit organization that uses the NIH materials in teacher training workshops, says: “I don't know anything else out there that is so up-to-date. And you can count on the quality of the resources because they have been developed by top scientists.”

In North Carolina, Suzanne Wilkison runs an organization similar to Chowning's. In April, when she learned that NIH was planning to shut down its science education office, she immediately placed an order for 3000 copies of eight NIH units. “I panicked,” she admits. “I wanted to make sure we had a 5-year supply.”

Joan Thompson, a science consultant for the state's Department of Public Instruction, also placed an order. Next month, North Carolina school officials will pilot an updated course in biomedical technology, now taken by 8000 students each year, which draws upon eight of the



Principled learning. Teachers Amy Lindahl and Brandon Staton discover how to use NIH's exploring bioethics curriculum at a summer workshop.

NIH modules. Thompson says that the NIH material is a godsend for school administrators, in part because it is aligned with the next wave of education standards that many states are adopting—the Next Generation Science Standards and the Common Core standards for mathematics and reading.

Congress seems to agree that the office is worth preserving. This month, a Senate spending panel told NIH that it should “continue funding these programs in fiscal year 2014,” adding that “the Committee is not convinced that the quality of these programs

would be maintained if they were moved to other federal agencies.”

NIH's Tabak says that “of course we will consider the sentiments of the Senate.” But he notes that “we are at a very early stage” of a budget process that could extend well into fall.

—JDM