

Knowledge to Make Our Democracy

By Wm. David Burns

MANY WRITERS, commissions, and panels of leaders have pleaded a case for improving scientific literacy and numeracy as a fundamental goal for our democracy and a critical challenge to be met by those designing a good college education. Developing these capacities within a civic context becomes more urgent as emerging conditions and crises become increasingly complex.

Even though the justification claimed for increased capacity and "literacy" is a civic and political one embracing a democratic purpose, the approaches often fail to take into account a basic political fact of democratic life: namely, that the motives and interests of political actors are extremely important. For us, the actors who are the objects of reform are basically two: students and those faculty members expected to implement the civic literacy mandate. Their "interests" and "motives" need to be determined and respected (in a Kantian sense of respecting individual dignity), just as their "desires" (as post-modern thinkers have argued) need to be acknowledged as an ingredient in "mind."

In a democracy, the civic purpose for the development of these capacities carries with it an obligation to re-form the politics of learning. This has strong pedagogical implications, as Larry Cuban (2001, 87-91), for one, has argued. But it goes beyond pedagogy. Though this is part of a very big topic, in this article I want to pay attention to one issue, namely, the interests and motives of the principal parties.

To accomplish the goals of this essay I will reflect upon experiences my colleagues and I have had trying to move the study of one complex, capacious, and unsolved issue--namely HIV disease--that contains both scientific and other challenges from the margin closer to the mission in higher education. In the course of that effort, we've had the serendipitous benefit of learning something about science education. Those insights have, in turn, informed the development of a science education reform effort at AAC&U that we have named Science Education for New Civic Engagements and Responsibilities (SENCER).

SENCER is a national dissemination program seeking to improve learning and stimulate civic engagement by teaching science through a growing collection of complex, capacious, largely unsolved, civic issues, issues that interest large numbers of students. SENCER courses are fundamentally designed to improve intellectual capacity. Our thesis is that improved intellectual capacity--originating in and developing within a student's interests and motives and illuminated by real issues of civic importance--will also enhance civic capacity. The goal is to help students and graduates to make our

democracy, not just equip them to survive in it. Thanks to generous support from the National Science Foundation, SENCER is currently working intensively with about seventy-five colleges and universities.

An origin story

The journey of getting from campus HIV education to SENCER has been anything but a straight path. The story I am about to tell illustrates another fundamental in both democratic theory and the philosophy of science. That is indeterminism. Historian William Cronon (1999, 39) expresses this indeterminism beautifully in a passage relating to the relationship of disciplinary aims to the aims students have:

If our disciplines are to serve the larger goal of liberal learning, we must recognize that we are a bridge for a journey whose end we do not know and that we ourselves will never see. We must therefore think about what kind of bridge we want to be. How capaciously and generously do we want our teaching to serve as a pathway our students travel towards destinations different from our own?

I think Professor Cronon would agree with me that a natural science sensibility combined with open-mindedness and attention to the motives and interests of people other than oneself is a helpful "tool" to take along on a reform journey. As Edmund Burke, also seeing the civic challenge in scientific terms, wrote: "The science of constructing a commonwealth, or renovating it, or reforming it, is, like every other experimental science, not to be taught a priori" (in Barber 1984, 131).

My origin story starts in the late 1980s. While a member of the administration of Rutgers University, I applied for and received one of the first five cooperative agreements from the Centers for Disease Control (CDC) to support the creation and development of higher education consortia in states with high incidences of HIV disease. Relatively early in the nation's experience with AIDS (the first cases were identified only a few years earlier) the CDC's goal was to galvanize greater attention and to encourage institution-wide reforms in the areas of policy and prevention.

In 1989, the extent of HIV infection among college students was unknown, but there was good reason to believe that, if the virus (HIV) that caused AIDS had also been present in their encounters, the sexual practices and other co-factors in the behavior of youth at high risk established conditions that would support an epidemic.

The efforts spawned in these early prevention projects were directed at acquainting students with HIV and risk, encouraging them to assess their individual risk, and then teaching them how to efficaciously reduce or avoid that risk. These interventions, offered as part of public education campaigns or co-curricular programs, were mostly conducted by staff and peer

educators. With a focus on "protecting oneself," the essential maneuver in these programs was defensive. One acquired "education" to reduce one's own risk and one's sexual partner's, as well. Far less attention was paid to what we have come to call "our common health" -- with all that such a focus would entail in terms of civic responsibility, concern for others, and any necessity to learn anything beyond the essential defensive tactics.

A multidisciplinary issue

Throughout the 1980s, HIV was also puzzling scientists and clinicians--so much so that June Osborn, dean of the University of Michigan's School of Public Health and chair of the first National Commission on AIDS, made what has now become a famous observation. She called AIDS "multidisciplinary trouble." In addition to being a vexing hematological and somatic phenomenon, AIDS was also inspiring complex and stunning new cultural and political phenomena. From ACT UP and its assault on the sedate and orderly processes of drug approvals, to the reversal of silence and shame that was represented by the unprecedented public commemoration of those dead of AIDS by covering the Mall in Washington with the AIDS quilt, HIV was becoming more than a disease. Though the disease was certainly describable within biology, HIV was clearly not just a biological event. The multitude of cultural meanings assigned to and acquired by HIV generated an equally expansive collection of explanations for the disease itself. All kinds of claims were being made about its origins, patterns, nature, "purpose," and future. Those seeking to garner attention, incite interest, and influence behavior invoked a wild range of images, from the Bubonic plague to the "bizarre" dining practices of aboriginal people. AIDS was indeed multidisciplinary trouble.

Where, in those early days in the struggle to sort out the competing claims about HIV, was the intellectual authority of colleges and universities? To be sure, much of what was known then and is known today about HIV is the product of great knowledge-producing traditions resident in higher education. But the response to the general "crisis" of HIV as it applied to the daily lives of students was almost exclusively administrative and defensive. Those doing health education, for example, were essentially "mediating" agents on campus. They lacked the "authentic" knowledge of the truth of the very messages they delivered. If asked, "How do we know that mosquitoes don't transmit HIV?" for example, those of us answering the question had to resort to "That's what the CDC [or some other authority] says." It didn't seem necessary either to help students derive the answer from knowledge that they, as the target of the message, already possessed, or to increase their independent capacity to assess and choose answers to emerging questions. The best we could do was say, "We'll let you know when we find out." Almost no attention was paid to figuring out how students might produce knowledge, though time and resources were devoted to trying to improve their inclination and capacity to consume knowledge. This condition doomed us to being at the mercy of re-reaching and re-teaching students when new "facts"

were discovered. With something as labile as HIV, things were changing at a rapid pace. Beyond that, we really needed to concentrate our efforts on changing behavior and not just providing information. Moreover, the complex question of the relationship of knowing to doing was always on our minds.

Search for Academic Validity

The challenge was to find a way to mobilize the core resources of the university for intellectual purposes and as a strategy to make HIV something of general--not just personal--concern. That was my mandate, my interest, my motive. To me, this meant locating the study of HIV within the constellation of other symbols of centrality and value (of what really mattered). And that involved getting HIV into the classroom and the curriculum--the credit-worthy parts of the institution where theory, discovery, research, and authentic knowledge hold sway.

We needed a course on AIDS, but not just a "boutique" course that would only attract people who were already actively interested in HIV, but something that would reach lots of students. Pr/teaching to the choir wouldn't do. I'm sure I would have liked something general and mandatory for everybody, so concerned were we back then about a potential for a disease outbreak. It wasn't enough for HIV to be just another (and quite miniature) "station of the cross" in the freshman orientation program. We needed more, and we needed to do more to engage students whose interest in HIV wasn't as urgent as we wanted it to be.

Here's where the story acquires someone I regard as a hero. One of our academic deans to whom I mentioned my desire for an AIDS course said he'd always thought we should have one. More important, he knew the perfect person to put it together, a microbiologist named Monica Devanas. Monica was regarded as an extraordinary teacher who was especially gifted at teaching what one of my friends calls "a microphone course" (meaning a big enrollment class). When we first talked, Monica's interests centered on finding ways to engage students' interests in biology, but she had no specific desire to focus on AIDS. Her research area was microbial ecology. She wasn't an AIDS activist. I say this because it turns out to be one of the counter-intuitive lessons I have learned in doing this work: The interest and passion for the subject of HIV and the other complex civic issues in question often develop from trying to wrap one's mind around a hard topic as an "outsider." Monica was game for a new challenge. There was no course already set up that she could just tweak and teach. So what should she do?

Politically, it would have been exceedingly high risk to propose an HIV course, especially to be developed by a person who had neither expertise in the subject nor high departmental status. The new course approval process, while appropriately rigorous, was time consuming and cumbersome. It wasn't designed to facilitate experimentation or the testing of new ideas. With the leadership of Emmet Dennis, the undergraduate chair in biology,

we developed a strategy. Already on the books was a course under the rubric of "social biology." The "deal" Emmet allowed us to strike had these "experimental" elements: (1) Monica would develop and teach the course, to be called something like "HIV, Biology, and Society" as a social biology course, (2) an evaluation of the course's effectiveness by an evaluator approved by the department and using the department's standards would be conducted, (3) I would fund the initiative from course development and implementation to evaluation, and (4) if the course succeeded in the department's terms, Emmet would see that the department would support the course in future years.

The idea was simple: Monica would teach through the phenomenon of HIV to the canonical elements of biology that the department expected a non-major to learn in order for the experience to both qualify as "biology" and fulfill an undergraduate distribution requirement in the sciences. To create the course, Monica was faced with several challenges (challenges reported to be common to SENCER courses, in general). These included:

- identifying the basic biology that the department thought a student should master (the canonical elements). A "survey" permits this without a specific context, so a very broad range of content can be covered. A course about a particular thing contains the limit that thing imposes,
- identifying all the elements or ingredients within the phenomenon of HIV that "matched" and/or could be illuminated by the canonical elements in biology, and vice versa (things about HIV that one needs biology to understand),
- figuring out how to re-order the biology to let it unfold with the HIV story and not the other way around,
- acquiring knowledge and expertise that one needed but didn't already have (protection for moving out of one's intellectual comfort zone),
- developing a text (none was available),
- figuring out what would be left out if only the biology of the disease was covered and experimenting with strategies to get it "covered" while not sacrificing too much of the biology that had to be covered,
- pitching the course content at a level that would be challenging but not overwhelming and that would keep the students engaged,
- creating assignments that would support the pedagogical goals,

- inventing communications strategies to keep students in touch with one another and with the instructor, and planning to deal with the emotional dimensions that real topics, like HIV, would inevitably stir up,
- determining what needed to be assessed and how that would be done, and
- marketing the course.

This last challenge turned out to be the easiest. The course appealed to students' interest, and they had a motive to learn about something that most had vaguely (and some loudly) heard was a factor in their communities. The course marketed itself.

We learned the first lesson about motive and interest: if a student can satisfy two needs at once (in this case the need to acquire a science course for a degree, on the one hand, and curiosity and interest in something as compelling as HIV), the student will take the opportunity to do so.

Since the course was first taught, more than 4,000 Rutgers students have enrolled in it. Enrollment has to be capped; the demand has been and continues to be great, even as HIV gets buried under a pile of issues competing for the attention of students. The campus student newspaper, *The Daily Targum*, in a rare excursion into matters curricular, spoke for student interest when it editorialized, "Give Us More."

Space doesn't allow me to describe the rest of these challenges in any detail. I do want to talk about two specific innovations that reinforce the point about interests in and motives for learning and strategies for enabling students to learn some science to become "contributing citizens." These are the "wrap-around" courses and a research project that began as an extra credit assignment and has now become integral to the course.

Two innovations

Wrap-around, really a misnomer, was the name we chose for a series of associated courses developed and taught along with the HIV and biology course. We created one-credit courses originating in a student's declared academic interest (this could be education, literature, environmental studies, Africana studies, child psychology, communications/journalism, or criminal justice, to name a few). The wrap-around would organize the encounter with science through the student's academic discipline or pre-professional area of interest. The science gained would reinforce the learning in the originating discipline with the interests of the originating discipline guiding the student's "use" or path through the science. So the journalism students wrote articles explaining the "science" of HIV to the general public, for example. The learning got connected; the relationships among knowledge systems were

made less obscure. Today, what survives of this original experiment are some linked courses that engage and maintain support in traditional ways.

This part of the story makes a simple point--one that William James made a century ago: The passageways of one's interest are what lead to new learning. Respecting them might just improve that learning.

The research project was created to accomplish two things: thwart a potential for calculated indifference and harness the knowledge students could produce. Remember, Monica was the solo teacher in a class of 400. A student who doesn't covet attention can pretty much count on being anonymous. Beyond test performance, there's almost no chance to be enlisted in the actual production of knowledge. The research project encouraged knowledge production and use, as well as engaging the student in a type of "politics"--namely, putting forward one's ideas for others to inspect and critique.

Students were asked to choose a target for intervention (prevention, management) and to develop a program to deal with the HIV--related issue involved. They had to show why they selected the strategy they did, from reputable intellectual sources evidencing knowledge of the disease. They were then required to submit their proposal to three reviewers (they could be fellow students, parents, friends, anyone of their own choosing), and those reviewers were required to submit a written critique. Beyond that, they were asked to submit their work to an "expert" in the relevant area and acquire a critique from the expert as well. From a pedagogical perspective, this approach was very appealing to Monica. But from the position of my interests and motives, when we first did this, 400 students showing their work to another 1,200 people (not to mention the "experts"--some of whom were not HIV experts at all, but "marketing" experts, for example), meant that almost 2,000 people were at least doing a little thinking about HIV.

The lesson here is that when students are taken seriously as knowledge producers, they take themselves more seriously and they produce. Thus, the political situation that the assignment put them in demanded civic responsibility from them.

There is another lesson here: Students (and citizens) will work harder if they are taken seriously as people capable of producing something (in our case, knowledge), not just vessels to be filled and then episodically emptied to determine what had been inside.

What about that evaluation mentioned earlier? It proved quite interesting. The results were mixed: First, we established significant learning gains in biology (which was good). Second, we established that there was some room to make the science still "harder"--that is, many students had better preparation and capacity than we had assumed. The third thing we found out was a disappointment for me. I had gotten into this with the hope of seeing

behavior change (some reduction of risk for HIV). That happened, but not at an impressive level of significance. We attributed the disappointing reduction to not having actually focused on it within the course. Since we hadn't made much room for that in the course, it should not have come as a surprise that it didn't emerge from the course. There were other findings that allowed Monica to modify the course, something that she has done in each successive version.

The course Monica developed differed from the usual offerings in one other important way. In the beginning, we very explicitly let students know how much we needed them to make this course work, and, more importantly, to make our democracy work. We did this in a variety of ways, from the rather unorthodox gesture of having me, one of the countless university vice presidents, address the class to thank the students directly for embarking on this experiment with us and to tell them how much what they would learn and contribute to the learning meant to us. We delivered a message students don't hear often enough: We need you and the knowledge you can produce.

National models

To return to today, I'll conclude by mentioning that, in addition to featuring the HIV course that Monica created as a SENCER national model, we are pleased to have examples from physics, geology, biology and public health, environmental sciences, conservation sciences, and chemistry. Developed in institutions in all sectors, from research universities to a community college, they are diverse in multiple ways, but they have common elements. One of the most important is taking interests and motives into account.

The courses attract engagement today by focusing on things that need to be attended to today. They require the knowledge students bring to the learning experience. They embrace pedagogies that themselves model good natural science and political principles. They work to help students come to conclusions of their own about controversial issues. Indeed, they help students see what is missing from the conclusions and opinions they have reached. They help students encounter things that are hard to understand and help them stick with difficult subjects longer. From treating subjects in depth, they derive breadth of knowledge with attention to the connections to things beyond the rich but parochial gaze of a single discipline. Many of these courses make opportunities for students to be directly civically engaged; others leave that entirely to the student's discretion. All stimulate intellectual engagement. In the end, they aim at a deeper form of capacity, one that employs knowledge to make our democracy.

We can't be sure this is all happening with the degree of success we envision for it. Our evaluation and assessment efforts will help us make these determinations. But we do know this: Our chances--as Monica's were--are good because early in this journey we took our own, our students', and others' interests and motives into account, and we planned a polity to make

it possible for those interests to influence our work. This isn't sufficient to achieve the lofty goals we share for a democracy, but it is a very good, and necessary, place to start.

As I write this, my six-year-old twin daughters are starting first grade. The girls, like so many kids, are born natural scientists. Helena is fascinated by ants and bugs; Caroline by the stars in the heavens. The truth is that they are even more interested in ballet and swimming, or, for that matter, in gum chewing, right now. Their school is a special magnet school with emphasis on math and science (we chose it to compensate for what are not their parents' immediate strengths). We're hoping that school will help these interests develop and flower, but, of course, we do not know.

The girls enter public school having come from a Montessori kindergarten where "follow the child" was the injunction. In the new school, I noticed in one classroom the class rules written in distinctive clear printing; the first was: "obey your teacher." It seems to me that the polity we desire--and the learning we seek to cultivate--needs to find some way to negotiate and embrace these two seemingly contradictory notions. This is where science and civic engagement define similar projects. It is here democratic theory gives us a glimpse--one that I have tried to develop in this essay--of how we can achieve a vital goal.

I want an education for my children that doesn't just give them defensive armor to protect them from other children who may have greater knowledge and power. Instead, I want for them learning and the courage to use it to make and re-make our democracy for themselves, surely, but also with and for other children, as well. It will be great if they stay interested in science and numbers, too. Our job is to make the conditions right so they can.

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