

Creating Civically Motivated Science Students

Why Is It Important to Teach Civics in Science Education?

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Abstract: Only three of the State of Ohio American Government standards address the teaching of civic responsibility, suggesting that these standards somewhat overlook this very important aspect of education. However, both research in the field and the current state of global affairs suggest that we should be teaching students not only more ways in which they can be successfully civically engaged, but also that we should be teaching civic engagement in our science classrooms. This article identifies the relationship between civic activism and science education while addressing the contemporary world issues that intensify the need to merge both this set of social studies and scientific disciplines.

Introduction

100,000 men, women and children fill the streets of our nation's capital on this cloudy day with signs and umbrellas. Today is Earth Day- but it is not a regular Earth Day. After all, we've had 47 official Earth Days. What makes today different? Stages and platforms are set up throughout the city. Speakers engage citizens all day in speeches about science, education, knowledge and the Earth -- speakers like Bill Nye and Michael Mann. Musicians play throughout the day. Among the many soggy signs are some reading the following:

"S.O.S: Save Our Science," "Alternative energy = JOBS...alternative facts = LIES," "Up and Atom Time to March for Science," "Think while it is Still Legal," "Time to React," "Powered by Science & Strengthened by Diversity,"

Why have 100,000 people come out today into the cold and wet? They're here to stand up for the promotion of the idea that science is a pillar of freedom and prosperity. They're here to voice their concerns and their support for citizens of this country, and in the global community, to vote for policy makers who are going to create and uphold legislation that uses scientific evidence and research to make the informed and educated decisions needed to further societal progress.

Washington DC, April 22, 2017

Civic Engagement and Social Studies

Where Do We Find It?

In Ohio, civic engagement is taught in American Government classes, which are typically reserved for 11th and 12th grade students. Depending on the district, this course may only last one semester. Within American Government classes, civic en-

agement is part of only 2 or 3 of the 25+ state standards. It is apparent that teaching students to be civically literate is not a priority in our education system. Not only is there a lack of deep engagement with civic education within the discipline of Social Studies, but civic literacy is barely touched on in most other disciplines (e.g. English Language Arts, Math, and Science). In particular, science students suffer greatly as a result of civic education being absent from science education. By excluding civic education from the science classroom, we rob our students of an understanding of the deep interrelationship between citizenship and scientific understanding.

According to Ehrlick (2000) civic engagement is the process in which an individual works to make a difference in their community through the understanding of various values, skillsets and knowledge structures that help the progression of said community. Similarly, the New York Times uses Ehrlick's work to define a civically active individual as one, "working to make a difference in the civic life of one's community and developing the combination of knowledge, skills, values and motivation to make that difference" (New York Times, 2007). Currently, Ohio's Standards for Social Studies 1, 2 and 20 for American Government are the only standards that directly address civic engagement and civic responsibility (Ohio Department of Education, 2010).

American Government Standard 1 promotes the development of a basic understanding of governmental powers and the processes by which decisions in government are made. The analysis of public policy processes allows for teachers to implement projects and assignments that have students address societal issues and engage in the advocacy for and creation of their own policies in ways that simulate their actual political potential. American Government Standard 2 promotes the examination of various views on public issues as well as into the interest groups and political parties who hold those views. Students may be prompted to select a civic issue to resolve through the defending of the viability of a position on this issue. For example, I dedicated a total of two weeks to civic engagement this year while teaching a semester long American Government course; according to my fellow Social Studies teachers, this was significantly more time that would typically be spent on civic engagement.

Standard 20 encourages the exploration of the various ways in which an Ohio citizen can impact their local government and therefore effect societal change. In particular, this area is one in which a real opportunity is missed. Given what little time there is to cover the various standards while implementing beneficial and data-yielding projects, teaching beyond the scope of the standard description can get tricky. It is not uncommon, while teaching about civic responsibility, for educators to fail to pull real-world issues into the mix, despite there being such profound and ready opportunities to do so.

Clearly, civic engagement is not at the top of the priority list when it comes to the Ohio standards in American Government, so it certainly is not a priority in our biology, physical science or physics classrooms. Why should it be?

Science and Civics A Natural Fit

On April 22, 2017, an estimated 100,000 people participated in a march for science in Washington DC with an estimated 1.6 million people marching for the same worldwide, in over 500 locations. Its purpose was to promote evidence-based policy-making in government (Mervis, 2018). People took to the streets in an organized and efficient manner to protest antiscientific policies coming from our government. According to Sneed (2017) it has historically been unusual for researchers and scientists to become engaged in such advocacy, but recently this movement has gained enough traction to become a lasting one.

We've heard of the various social movement marches taking place over the last few years; the March for our Lives, the Woman's march, Black Lives Matter, PRIDE, and now, the March for Science. But what made the March for Science different from the others? Although these are all social movements, the movements I mentioned formerly are very clearly labeled as social justice movements, dealing with individual and group rights. So, where did the March for Science come from?

We don't often see scientists taking to the streets in protest of anything. Many in the scientific community have resisted doing so because they feel that such engagement may make science seem like just another interest group, something they wish to avoid. However, many scientists have begun questioning this inaction, given the reality that our policy makers have the power and legitimacy to accept or ignore scientific research and evidence that affects our daily lives, our health and our future. As Sneed (2017) argues:

People who value science have remained silent for far too long in the face of policies that ignore scientific evidence and endanger both human life and the future of our world. Staying silent is a luxury that we can no longer afford.

A growing number of members of the scientific community agree with Sneed, and the science movement has been triggered by the civic activism awakening that has taken place within the scientific community. As with any movement, it is the result of fed-up citizens demanding change and reform.

The range of scientific issues currently in the news makes it clear that civic society and scientific progress are naturally linked and should be treated as symbiotic entities. We can see this by briefly engaging with the subjects of climate change and alternative energy. In terms of climate change, currently in our nation's capital, we have lawmakers drafting and approving legislation that is halting scientific research and progress. The head of our Environmental Protection Agency (EPA) doesn't believe that the Earth's climate is changing. As a nation, we've abandoned our involvement in the largest global environmental protection agreement that has ever existed.

As far as alternative energy goes, the biggest perceived enemy of the U.S. is called the Islamic State of Iraq and Syria (ISIS), or alternatively the Islamic State of the Levant (ISIL). They are bent on taking over territory by means of terror. If the Western countries did not need the oil that these terrorists control, the money that ultimately funds their operations would dry up. They could no longer operate as a terrorist state (Nye, 2016).

Bill Nye -- celebrity scientist, chief executive officer of the Planetary Society, and mechanical engineer – makes this assertion as one among example among hundreds, and marshals a range of issues to point out the clear link between our scientific progress (or lack thereof) and forward looking global politics and policy making focused on the preservation of the Earth and of humanity. We are living in a time where parents are choosing to let their children go unvaccinated, all because of an article published in the 90s that was later debunked and recanted completely. The number of people jumping on the bandwagon of flat-earth theory is growing. It is vital that those who are drafting and passing the legislation that makes or breaks our progress and our protection are knowledgeable about and accepting of the very basics of scientific research, theory and opportunity. This is why we need to be teaching our science students to be civically literate.

The *How* in All This

There is a simple solution that will allow for our education system to begin the morphing of the teaching of civic responsibility in science education. It begins with making the discussion of societal issues, particularly in science and health, a normal part of everyday discussion in our science classrooms.

Making connections to current events is a simple yet crucial part of engaging students in real-world scenarios and issues while allowing for the facilitation of critical thinking and problem-solving within the discussions of these topics. Beyond this, teachers can offer inquiry-based and project-based assignments that engage with the goal of connecting scientific thinking to civic engagement. This is much easier to do than it may seem. By connecting science projects and labs to objectives that have civic merit, such as investigating the water quality in a local stream or river, students build the connections between the two, making the science project or lab more relevant in their lives, which is an overall cornerstone of education. Communication is an important aspect of every subject, and is included in the standards for every discipline. In the 21st century, scientific issues have become more politicized than ever, and it is our duty as educators to teach our students, particularly in our science classrooms, how to communicate an ethical, cultural and scientifically-informed position in a way that promotes action and further civic engagement.

Integrating civic engagement and science education has further benefits. By doing so, we add justification to the already important scientific concepts being taught. We continue to build upon relevancy in bridging the gap between concepts, labs and projects and the student's daily lives, while encouraging civic literacy and critical thought. This also encourages teachers to offer high-quality instruction, because it precludes simply teaching from the text, instead requiring them to make the most out of current scientific events, findings, and research. In other words, this isn't something you can fake. This may make doing so daunting to some teachers, but it should also make it appealing to administrators and other educational decision makers.

Additionally, this integration will provide a vehicle for meeting the cross-curricular goals many schools and districts are striving for. Just as we understand that teachers across content areas are always also teachers of reading, so should science

teachers be looked at in regard to the teaching and facilitating of civic literacy and responsibility.

I end my final points with another quote from Bill Nye's *Unstoppable* (2016):

We can become a great generation that leaves our world—our home—in better shape than it is now while raising the quality of life for people everywhere. This will not be easy. We've already loaded the atmosphere with enough heat-trapping gases of various kinds to cause our planet to keep warming for many, many years to come. But the situation is far from hopeless. (p.2)

Although in this quotation Nye is specifically addressing climate change, his words can be applied to all societal issues that involve science, and as supporting the importance of teaching civic responsibility in science education. It is up to us as educators to assist our students in engage with and attempt to understand complex societal issues concerning scientific research and data while teaching them how to impact the world around them. Nye is right; the mission is far from hopeless; particularly if we begin making changes starting in our science classrooms.

References

- Ehrlich, T. (2000). *Civic responsibility and higher education*. Phoenix, AZ: American Council on Education.
- Mervis, J. (2018, April 4). 2018 March for Science will be far more than street protests. *ScienceMag.org*. Retrieved from <http://www.sciencemag.org/news/2018/04/2018-march-science-will-be-far-more-street-protests>
- New York Times. (20017). The definition of civic engagement. *The New York Times*. Retrieved from https://archive.nytimes.com/www.nytimes.com/ref/college/collegespecial2/coll_aascu_defi.html?mcubz=3.
- Nye, B. (2016). *Unstoppable*. New York, NY: St Martin's Press.
- Ohio Department of Education. (2010). *Ohio's New Learning Standards: Social Studies Standards*. Columbus, OH: Author.
- Sneed, A. (2017). The march for science is just the first step. *Scientific American.com*. Retrieved from <https://www.scientificamerican.com/article/the-march-for-science-is-just-the-first-step>.



About the Author

Elizabeth Laubender received her Master of Education at the University of Toledo and is licensed in grades 7-12, AYA Social Studies. She studied international politics, government and black world studies at Ohio Wesleyan University, and currently coordinates a robotics program which seeks to merge interests of global issues and STEM principles and projects.