

Spencer, J.P. (in press). Reflections of a civic scientist. In H. Boyte (Ed.), *Democracy's Education: Citizenship, Public Work and the Future of Higher Education*. Nashville: Vanderbilt University Press.

## Reflections of a Civic Scientist

John P. Spencer

Department of Psychology and Delta Center, University of Iowa

*I walked around as you do,  
investigating the endless star,  
and in my net, during the night, I woke up naked,  
the only thing caught, a fish trapped inside the wind.*

--From "Enigmas" by Pablo Neruda (Translated by Robert Bly)

*Isn't that what you do, Sonia...don't you take your net and throw it out into these far out places of quantum physics and systems theory, and don't you find that the only thing you ever catch is your own self back again? Like a fish trapped inside the wind. Where are the other people in your system, Sonia? The ones you love...the real people with their qualities, longings and weaknesses...where are you inside there, Sonia?... Life is infinitely more than yours or mine obtuse theories about it. Healing the universe is an inside job.*

--From 'Mindwalk' by Bernt Capra

Harry Boyte's lead essay seeks to reinvigorate a sense of public work in higher education. This reflects a savvy understanding of how the world works—people are motivated to create change when change is integral to their self-interests. And if there's one truth in academia, it's that academics are *deeply self-interested* in their work. If we could make scholarly work civically engaged, then the energy, spark, and creativity of academia would be unleashed in the world. Rather than focusing our efforts on disciplinary endeavors or the betterment of a college or department, we could focus our work on the betterment of humanity.

Boyte's essay also highlights the importance of understanding knowledge and power. To create the world as it should be, you have to understand the world as it is. In our world, knowledge can bring power. Nowhere is this more apparent than in the world of science. Science infuses our daily lives and has a transformative effect on society in the form of medical advances, technological innovation, and tools to enhance our efficiency. Science is clearly a major source of knowledge and power in today's world.

Given that much of science in the United States takes place at research universities, it is critical that science be a central part of any discussion that seeks to reinvent or reinvigorate higher education. In my essay, I offer some reflections on the current state of science in society and point toward a new concept—civic science—that might impact public work in the sciences. These reflections include a particular civic science endeavor on school readiness that my colleagues and I began in 2012 with community partners in Iowa. The project—called 'Get Ready Iowa'—shows an example of civic science in action.

## **The Knowledge War**

Science is a great source of knowledge and power in the world today, and also a lightning rod for societal conflict. Today, societies face multiplying global crises—from economic collapse to global warming to crises in education and healthcare. This has led people to question the relationships among science, expert knowledge, democratic governance, and lay citizens. At the center of this questioning is an ideological battle—a knowledge war—that presents a fierce obstacle to public problem-solving. This war exacerbates the polarization in our national civic and political life.

Harry Boyte, Scott Peters, Gwen Ottinger, Sherburne Abbott, and I recently articulated the multiple sides of this knowledge war. On one side is the cult of the expert (see Boyte, 2009). This side represents a detached and technocratic approach to engaging science in society, championing the authority of “objective” scientific and disciplinary knowledge, while delegitimizing the authority and knowledge of lay citizens. Here, elite experts communicate the results of scientific research to the masses who are viewed as passive clients and consumers of expert help and knowledge. If the masses fail to accept the authority of science for practice and policy, the remedy is to seek better messaging strategies, scientific literacy campaigns, and more energetic efforts to communicate scientific knowledge to citizens.

A second perspective can be characterized as an anti-intellectual “know-nothing” stance of victimhood and grievance, deeply hostile to scientists and science en masse. Know-nothing politics disparages and demonizes academic knowledge, science, and professional practices in the name of common-sense values and personal experience. This view is, arguably, a backlash against a technocratic stance that has lost the public’s trust by claiming to know everything while simultaneously failing to provide solutions to global crises. Further, lay citizens whose skills and knowledge go unrecognized by the scientific elite may assert their common sense as a means of preserving their social identities (Wynne, 1996; Michael, 1996). Critically, the “know-nothing” stance is no more helpful in solving real-world problems than the technocratic approach.

The knowledge war’s third side involves the production of claims and counter-claims by competing groups on different sides of a controversial issue, who recruit and fund their own experts and scientists to produce studies that favor their own positions. Although some such groups can be fairly accused of outright manipulation and misrepresentation of the scientific data (Michaels, 2008; Oreskes & Conway, 2010), others struggle over legitimate but divergent ways of framing questions, collecting data, and interpreting evidence (Sarewitz, 2004; Brown, 1992). The trend towards counter-expertise plays into larger dynamics of polarizing methods of political action and the erosion of spaces where diverse people interact in a productive, face-to-face fashion. The result is a Tower of Babel that hinders rather than enriches our public life.

## **Civic Science Offers a New Path Forward**

Transcending the knowledge war calls for an approach that simultaneously values science and respects the knowledge, experience, and identities of people without scientific credentials to help build shared understandings and solutions rather than reinforcing factions. My colleagues<sup>1</sup> and I have been working to reframe one approach—civic science—by emphasizing the “civic agency” of diverse participants in creating a sustainable, democratic way of life. As summarized by

---

<sup>1</sup> I want to acknowledge Harry Boyte, Scott Peters, Gwen Ottinger, and Sherburne Abbott for collaboratively shaping these ideas.

Bäckstrand (2003, p. 24), “Civic science alludes to a changing relationship between science, expert knowledge and citizens in democratic societies. In this perspective, citizens and the public have a stake in the science-politics interface, which can no longer be viewed as an exclusive domain for scientific experts and policy-makers only.”

The desire to bridge the gap between scientists and non-scientists comes, in part, from philosophical arguments that are deeply critical of the “objectivist” stance of main-stream science. The objectivist stance asserts that science contains trans-cultural, socially neutral theories, models, and methods that enable scientists to “detect the facts about the order of the universe that are everywhere and always the same” (Harding, 2000, p.122). But this ideal is rarely the case in practice. Although controlled laboratory methods and reductive science have produced great insights, these insights only rarely translate directly into real-world solutions for the complex problems we face.

A key innovation of civic science is its *democratic* frame, part of a call for “strong democracy,” extending normative values of participation into the scientific enterprise. In our view, the democratic frame is important, but requires refining what it means for science to play a role in a healthy, functioning democracy. This requires explicitly acknowledging two things: that science is *political* and needs to shift from simply providing technical information to assisting in the process of governance and that science must be conceptualized within a *civic agency* framework.

### **Reframing Civic Science**

Civic science builds on a rich history of efforts to translate scientific findings to real world settings, full of complexity, ambiguity, and open-endedness, where science cannot be “applied” in any linear or straightforward way. But it frames these efforts with a new premise: that science is an essential part of politics, and therefore, should assist in the process of governance, as well as provide input into policy. In these terms, “politics” is the interaction, negotiation, and integration of different interests and vantages to solve common problems and to create a shared way of life.

Civic science sees science as a resource for action *in* the world, more than simply a description *of* the world. As a living, dynamic practice rather than just a body of knowledge, science offers a powerful means of evidence-based learning and knowing that can be adopted and practiced by lay citizens as well as scientists. As such, it is a key tool of human and community empowerment. In this context, there is no clean divide between ‘basic’ and ‘applied’ sciences; rather, all forms of science—and all types of scientists—have the potential to directly contribute to discussions about the state of knowledge and how humans interact with one another and with the world around us. Indeed, using science effectively to solve real-world challenges, develop effective policies, and create a shared way of life requires the production of knowledge that strikes a balance between scientific and other forms of knowledge. This requires developing the capacities for working together, across partisan and other political divides.

Civic science also builds on a second central concept—*agency*. A sustained conversation has taken place over the last seven years between dynamical systems theorists who are generating an agent-based understanding of humans and human development, and political theorists and their partners who have placed agency at the center of a new “civic studies” field that extends beyond the liberal-communitarian arguments in political theory (see Levine, 2014). The result is a framework emphasizing individual and collective *agency* where scientists are understood to be *citizens*, working with fellow citizens, to solve real-world problems and develop new individual

and collective civic identities in the process of such work. This frame holds potential to take the discussion of civic science to another level of usefulness in addressing a range of challenges. Thus, a key goal of civic science is to tap the vast potential for scientists to act with citizens—as citizens—to change the world.

### **Civic Science in Action: Get Ready Iowa**

To illustrate a civic science approach, I turn to a specific example—the ‘Get Ready Iowa’ (GRI; [www.getreadyiowa.org](http://www.getreadyiowa.org)) school readiness initiative funded by the Delta Center and the Obermann Center for Advanced Studies at the University of Iowa.

The motivation for this project comes from recent data on the state of school readiness in the United States: between 35 and 45 percent of first-time kindergarteners are ill-prepared to succeed in school (Hair, Halle et al., 2006). It is widely recognized that early environments that provide consistent, stimulating and emotionally stable care for both toddlers and preschool aged-children have a lasting impact on academic success and promote long-term benefits to the well-being of children. Three long-running studies—the High Scope/Perry project, the Abecedarian project, and the Chicago Longitudinal Study—demonstrate the potential payoff. For instance, the High Scope/Perry project calculated a lifetime benefit of \$284,000 from a cost of \$17,600 per child—a return on investment of 16:1 (see Mervis, 2011). Critically, this project lifted individual children out of poverty, showing reduced rates of criminality, and resulted in higher life satisfaction into adulthood.

Efforts to build on long-running intervention studies have shown more modest success. The challenges are numerous: the most at-risk children come from stressed family situations, with parents who experience high rates of economic and social stress and depression; teachers of at-risk children often do not possess adequate preparation, earn low wages, and experience high rates of depression.

One promising direction of recent readiness efforts is to build on advances in the science of individual development. The idea is simple: if we understand the processes that underlie growth and change in cognitive abilities in the critical window before children enter kindergarten, we can target those processes to promote readiness. Efforts in this direction have focused on how multiple components come together in the form of higher-level ‘executive’ skills (Diamond & Lee, 2011). Data show that enhancing so-called executive functions can promote dramatic gains, but there is concern about whether skills generalize beyond the training context.

One insight from recent intervention efforts is that school readiness requires a ‘whole village’ approach: *parents* must be engaged in the learning process and have ready access to information about early development; preschool and pre-K *teachers* must be tuned into best practices that help foster basic readiness skills in center-based daycare and in the classroom; and *communities* must be active in supporting readiness initiatives and creating environments that are ready for children.

The goal of the “Get Ready Iowa” Partnership is to work toward a statewide effort to foster school readiness by harnessing the processes that underlie basic changes in cognitive skills birth to 5 years. This requires translating basic science into the real-world and partnering with colleagues from both within and outside the university community. We must tap the rich knowledge that parents, teachers, community partners, and researchers in education bring to bear on school readiness. “*Get Ready Iowa*”, therefore, pursues a view of “civic science” where

*citizen scientists, citizen teachers, citizen parents, and other citizens come together to share knowledge, work together, and develop solutions to real-world challenges.*

## **Get Ready Iowa Projects**

GRI launched in the summer of 2012 at a summer workshop sponsored by the Obermann Center for Advanced Studies at the University of Iowa. Since that time, the larger group has been building relationships through one-on-one discussions that focus on each person's self-interest: why is each person part of the GRI community; what motivates each person to create change; what resources does each person bring to the table? In the process of forging these personal ties, concrete projects emerged. I describe a few examples below, and then turn to some reflections.

***Week of the Young Child.*** Each spring, families in Iowa City and surrounding communities come to the Iowa Children's Museum to learn more about resources available to them and their children. Families learn about local childcare options, how libraries and other community resources benefit children, and activities and programs available to our youngest citizens. Last year, over 1500 people participated in this event, including state legislators who participated in a legislative breakfast.

***Playing is Learning*** ([www.playingislearning.org](http://www.playingislearning.org)). This project implemented by The Iowa Children's Museum is serving over 175,000 children and adults annually. 'Playing is Learning' infuses the Museum with simple, direct messaging within each exhibit, helping parents to understand how play shapes the brain for healthy child development. And the fun doesn't stop at the museum: children collect 'Game of Games' cards that they can take home. Each 'Game of Games' card has a 'Did you know?' section with basic information about early development, and a 'Try this at home' mini-game using simple materials that can be found in most households. This initiative is creating a deeper understanding about the connections between playing and learning and encouraging parents and children to experience the power of play first hand.

***Child Care Happy Hours.*** Held on Friday evenings at pick-up time, GRI team members go to local child care centers to meet with parents, eat pizza, and chat about topics related to development. While the children play mini-games with GRI staff, parents participate in a discussion about learning and school readiness with a researcher from the Delta Center. After the discussion, parents re-unite with their children to play mini-games together. This gives parents an opportunity to observe how playing and learning are connected. Parents leave with a take-home gift: a 'Game of Games' card deck designed to promote playing and learning at home.

## **Civic Science: Reflections from Community Partners**

The GRI initiative has achieved several successes 'on the ground', but it has also had a transformative effect by forming relationships among the many stakeholders involved in school readiness. Below are reflections from several GRI community partners that describe this impact.

*"Prior to the Get Ready Iowa initiative, our community included many individuals each making a small difference. Researchers were discovering how children learn, what skills are important for later life, and how those skills build upon each other. Professors were teaching college students about the latest research and best practices. Elementary schools were identifying children entering kindergarten who weren't 'ready' for school and labeling the missing skills. Head Starts and other early educators were working to teach early skills for children to be ready for kindergarten. Home visitors were striving to enhance the home environment to promote*

*school readiness and strengthen the parent-child relationship. Parents were working to understand what they needed to do at home to get their 4-year-old ready for school. All of those pieces reflect our community's wealth of information ranging from theory to research to practice.*

*However, there was little coordination between the efforts and we were missing the whole picture and the wisdom of our community partners. What good is it to know that children who live in language rich environments have greater vocabularies at age 3 if it doesn't impact our practice? What does this research mean for parents and other caregivers?*

*With the efforts of GRI, we have developed a symbiotic relationship between the research community and the direct care community. Today, we are moving toward a shared definition, and a shared understanding, of what it means to be 'school ready'. The exciting part is that we are exploring what 'school readiness' means not only for children, but for schools, child care programs, families, and the community."*

--Laurie Nash, Johnson County Empowerment

*"Before the creation of GRI, the early childhood community had a silo approach. My agency supports professional development of child care providers and as such we would get local teachers and AEA staff to provide presentations and our staff provided presentations and consultations to agencies and child care programs. We had connections and we had partners, but I think we lacked the conviction that together we were going to create change.*

*GRI made us consider the process of change, and our part in it. This took time to meet, to talk, to get to know one another and to develop a sense of trust to the point that people felt comfortable sharing ideas. GRI provides us with a unique opportunity to combine the academic talents that the University of Iowa has to offer with community commitment and understanding of local conditions to create practical projects to improve school readiness for all children in our community."*

--Susan Gray, Director of 4C's—Community Coordinated Child Care

*"Imagine a community where children are valued so much that valuable resources are purposefully dedicated to insuring that every child enters kindergarten ready to learn. Imagine every child walking into the classroom that first day of school with the skills needed to be successful and the incredible impact that would make on our future.*

*'Get Ready Iowa' is working to realize this vision, and the movement is gaining momentum. What began as a small group of like-minded individuals determined to make early childhood research accessible to families has gained dozens of partners that represent broad community perspectives committed to the needs of children.*

*'Get Ready Iowa' has created an awareness in this community regarding the absolute need for high quality early childhood development, both inside and outside the home, and is creating opportunities for children and their families that will shape the future of the next generation."*

--Deb Dunkhase, Director of the Iowa Children's Museum

### **Civic Science: Reflections from a Scientist**

As I reflect on civic science and GRI, I return to the theme of Boyte's essay—citizenship as public work. How can I create a sense of public work in my science?

One sense of public work I have explored connected my *teaching* to civic engagement. In the spring of 2013, I taught a graduate-level service learning course called ‘Public Theories of Development’. In this course, PhD students in Psychology joined forces with graduate students in Design Studio and with Playologists at the Iowa Children’s Museum. The goal was to bring the science of development to the museum through a student project designed to communicate the science of play and learning to museum visitors. The students learned about modern theories of development, critically examined the scientific literature on play, and evaluated how these concepts might resonate with children, parents, and grandparents. The result was the ‘Playing is Learning’ initiative described above.

Overall, the course project was a rousing success. But evaluation of the course itself was mixed. The students felt the real-world project took over the class content as the project evolved, and the science suffered. Thus, when I think about service learning in the sciences, there are some real challenges: scientists need to find the right balance between teaching scientific content and practicing civic science.

Beyond the classroom, I also pursued a *public scholarship* perspective. I was hoping to connect my research to the GRI initiative. This tapped my self-interest (I deeply care about my research), and I was open to a democratic view of science: maybe this project would give me new insights in the lab, shift my research questions, and so on.

That hasn’t happened, and that’s an important admission. I am a basic scientist. My research questions are in the lab; my work is deeply rooted in the experimental method, experimental control, and laboratory science.

These experiences have left me with several major questions. I am convinced that basic science is relevant to civic life. But what’s the path forward for the basic scientist? If scientists are already working 60 hours a week given the modern pressures of ‘big science’, can we realistically incorporate a ‘civic science’ approach?

This is where my thinking returns to the knowledge war. Whether it’s realistic or not, scientists need to carve out time for civic science *because science and scientific freedom is under attack*. If we’re going to win this war, we need basic scientists to get off the sidelines. We need to actively change mindsets about science to protect the freedoms we currently enjoy. Dzur (2014) states this motivation in his excellent essay. I modify his comments slightly here: the question to each basic scientist must be, ‘what have I done with my scientific freedom to promote the freedom of others?’

Placing the knowledge war at the feet of individual scientists seems like a losing battle. How can one scientist make a difference? This can lead to a sense of powerlessness—a theme repeatedly expressed in this volume. My response is in the form of an experience that did something remarkable—it made me realize my work was relevant; *that I was relevant*.

I was at a local conference on child development, education, and intervention research feeling oddly out of place, on a different planet. The world of application and translation was completely removed from my world of laboratory science. There was no discussion of how children learn, about the big picture concepts of development. It was all just about different intervention programs and which worked—most didn’t.

After listening to talks all day, I found myself talking to a parent during one of the breaks. He was representing his local parent group. He had a child with special needs at home. I asked him

my burning question from the day: *how do you think children develop?* He said, “No one has ever asked me that. I’m not really sure.” We had a great discussion. He told me wonderful stories about his daily interactions with his special-needs daughter and his sense that development was made from these accumulated experiences. I told him about the discoveries researchers have made about how those daily, moment-by-moment interactions create development. In this exchange, a civic scientist was born; I realized I could be relevant.

I’m still discovering what ‘civic science’ means to me. And I’m fortunate to have colleagues at the Delta Center who are joining in the discovery process. Although I’m not sure where this path will lead, I’m convinced that it’s time to unleash the relevance of science, and direct engagement with other citizens—as citizens—is a critical first step.

This brings me to the movie *Mindwalk*. In the movie, Sonia, a quantum physicist, is talking to a poet, Thomas Harriman. After a day of exploring quantum physics and complex systems theory, Thomas stands on the sands of Mont Saint-Michel as the tide comes in, eloquently reciting Pablo Neruda’s poem, and delivers his synthesis:

*“Where are the other people in your system, Sonia? ...the real people with their qualities, longings and weaknesses...where are you inside there, Sonia?... Life is infinitely more than yours or mine obtuse theories about it. Healing the universe is an inside job.”*

The new people in my system are the community of partners in GRI. I’ve discovered through this partnership that there’s a lot more to ‘healing the universe’ than my own obtuse theories. And these partners have taught me that it’s ok to take this ‘civic science’ experiment step-by-step. Each step can matter. I am not powerless.

I don’t know how to win the knowledge war. But I know we won’t win if scientists don’t get involved. Similarly, I doubt we can transform higher education if science isn’t in the mix. So I conclude with a call to action to scientists in higher education: it’s time to realize your agency, form relationships in your community, and start asking, ‘what can I do to change the world?’

After all, healing the universe is an inside job.

## Acknowledgements

'Get Ready Iowa' was launched at the 2012 Obermann Summer Seminar. This initiative is supported by the Spelman-Rockefeller Fund at the University of Iowa through a partnership between the Delta Center and the Obermann Center for Advanced Studies. I would like to acknowledge Harry Boyte, Scott Peters, Gwen Ottinger and Sherburne Abbott for collaboratively shaping the civic science concept, my colleagues at the Delta Center for exploring civic science in action, and Laurie Nash, Susan Gray, and Deb Dunkhase for sharing their perspectives.

## References

- Bäckstrand, K. (2003). Civic science for sustainability: Reframing the role of experts, policy-makers and citizens in environmental governance. *Global Environmental Politics*, 3, 24-41.
- Boyte, H.C. (2009). Civic Agency and the Cult of the Expert. *Kettering Foundation Working Papers*. Kettering Press, Dayton, OH.
- Brown, P. (1992). Popular Epidemiology and Toxic Waste Contamination: Lay and Professional Ways of Knowing. *Journal of Health and Social Behavior*, 33, 267-281.
- Diamond, A. & Lee, K. (2011). Interventions shown to aid executive function development in children 4 to 12 years old. *Science*, 333, 959-964.
- Dzur, A.W. (2014). The democratic roots of academic professionalism: Power and freedom in co-creation. In H.C. Boyte (Ed.) *Democracy's Education: A symposium on power, public work, and the meaning of citizenship*. Vanderbilt University Press, Vanderbilt, TN.
- Hair, E., Halle, T., Terry-Humen, E., Lavelle, B. & Calkins, J. (2006). Children's school readiness in the ECLS-K: Predictions to academic, health, and social outcomes in the first grade. *Early Childhood Research Quarterly*, 21, 431-454.
- Harding, S. (2000). Should philosophies of science encode democratic ideals? In D.L. Kleinman (Ed.) *Science, Technology, and Democracy* (p. 121-138). State University of New York Press, Albany, NY.
- Levine, P. (2014). The Case for Civic Studies. In P. Levine and K. Soltan, Eds. *Civic Studies. Bringing Theory to Practice/Association of American Colleges & Universities*, Washington, D.C. 3-8.
- Mervis, J. (2011). Past successes shape effort to expand early intervention. *Science*, 333, 952-956.
- Michaels, D. (2008). *Doubt is their Product: How Industry's Assault on Science Threatens your Health*. Oxford University Press, Oxford.
- Oreskes, N. and E. M. Conway. (2010). *Merchants of Doubt: How a Handful of Scientists Obscured the Truth on Issues from Tobacco Smoke to Global Warming*. Bloomsbury Press, New York, NY.
- Sarewitz, D. (2004). How Science Makes Environmental Controversies Worse. *Environmental Science and Policy*, 7, 385 - 403.