

Rural science education as social justice

Karen Eppley¹

Received: 1 October 2015 / Accepted: 31 October 2015 / Published online: 30 December 2016
© Springer Science+Business Media Dordrecht 2016

Abstract What part can science education play in the dismantling of obstacles to social justice in rural places? In this Forum contribution, I use “Learning in and about Rural Places: Connections and Tensions Between Students’ Everyday Experiences and Environmental Quality Issues in their Community” (Zimmerman and Weible 2016) to explicitly position rural education as a project of social justice that seeks full participatory parity for rural citizens. Fraser’s (2009) conceptualization of social justice in rural education requires attention to the just distribution of resources, the recognition of the inherent capacities of rural people, and the right to equal participation in democratic processes that lead to opportunities to make decisions affecting local, regional, and global lives. This Forum piece considers the potential of place-based science education to contribute to this project.

Keywords Rural schools · Social justice · Environmental education · Place-based education

“Learning in and about Rural Places: Connections and Tensions Between Students’ Everyday Experiences and Environmental Quality Issues in their Community” (2016) brought to mind two recent exchanges with colleagues about rural education. Both

Lead Editors: L. Avery and D. Long.

This review essay addresses issues raised in Heather Zimmerman and Jennifer Weible’s paper entitled: Learning in and about rural places: connections and tensions between students’ everyday experiences and environmental quality issues in their community. doi:[10.1007/s11422-016-9757-1](https://doi.org/10.1007/s11422-016-9757-1).

This paper is part of the special issue Cultural Studies of Rural Science Education.

✉ Karen Eppley
keh118@psu.edu

¹ Curriculum and Instruction, Penn State University, 259 Chambers Bld., University Park, PA 16802, USA

conversations reminded me of the insularity of rural educational research (see Howley and Howley 2014) and illustrate a pervasive misunderstanding of rurality as a relevant sociocultural context and its associated misunderstanding of the 12 million children who live in rural places and learn in rural schools (National Center for Education Statistics [NCES] 2013).

The statements are value judgments, and I interpret them as indicating a need for increased attention to education for social justice in rural places. The remarks suggest as well that this special issue focusing on science education in rural schools is necessary to fulfill a critical need for rural educational research that reaches practitioners and researchers who may not regularly read nor conduct rurally focused research, but also to more explicitly position science education in rural places within a social justice agenda.

The remarks

The first colleague suggested that improving the condition of rural communities and schools is hopeless because rural people continually vote against their self interest, electing representatives who make policies that perpetuate economic and social conditions unfavorable to rural communities. In other words, rural people get what they vote for and thus deserve their lot. This oversimplified view on the complexities around the voting tendencies of rural citizens is clearly not unique and is in fact similar to that expressed in 2008 by then-candidate Barack Obama:

You go into these small towns in Pennsylvania and, like a lot of small towns in the Midwest, the jobs have been gone now for 25 years and nothing's replaced them...And it's not surprising then they get bitter, they cling to guns or religion or antipathy toward people who aren't like them or anti-immigrant sentiment or anti-trade sentiment as a way to explain their frustrations.

Obama later attempted to explain his remarks: "I didn't say it as well as I should have" (Seelye and Zeleny 2008).

The second exchange was a simple and, I think, sincere question posed to me: '*Why do rural schools matter?*' Because I understand schools, people, and places as inextricably connected, I heard this question as inquiry about the inherent worth of rural people and places.

The three statements and their contexts, a university and the national political stage, illustrate that rural people are indeed the last marginalized group about which disparaging remarks can be openly made. Despite the very real material and social effects of rural disadvantage, the ideas indicate a lack of widespread identification of spatial inequity as a category of disadvantage alongside other established groups such as low SES, gender, and ethnicity (Roberts and Green 2013).

...the rural is emblematic of the most entrenched status quo and therefore represents in contrast to the potentially transformative positioning conferred by other contexts (e.g., race, gender, ethnicity)- a hopelessly regressive condition. Even critical educators equate the rural with machine politics, inbreeding, and racism (Howley and Howley 2000, p. 75).

Lacking transformative positioning, rural disadvantage is attributed to individuals' personal failings rather than understood as inextricably tied to complex social, cultural, geographic, and economic systems. The comments described here are readily identifiable

in major news outlets such as *The New York Times* (Kristof 2012), television programs such as *Children of the Mountains* (Sawyer 2009), and books such as *The Children of Sanchez* (Lewis 1961) and belong to discourses wherein rural people are hopelessly deficient and lack the intelligence to understand (and thus influence) their own social and political realities. From this point of view, it's not a much of a leap to see rural people and places as caricatures beyond hope and devoid of human potential.

It follows, then, that rural schools and communities *don't* matter. To most efficiently manage rural places, whatever human and natural resources can be scared up should be redistributed to other groups more effectively providing an economic return for our national investment in schooling. This positioning of rural citizens by politicians and others is not “just” ideology and stereotype. It produces material and social barriers for parity of participation in democratic life. Of Appalachia, Jill Fraley (2007, p. 367) writes:

Historically, stereotypes have been wrapped up in efforts to dominate and oppress—to take land and resources—through dehumanizing a group and eroding their dignity. In this way stereotypes are tools for oppression, and subordination of a particular group, and the establishment of lasting power structures.

Social justice, what Nancy Fraser defines as parity of participation, is an antidote to oppression and subordination in rural communities. Parity of participation in rural communities requires a “radical democratic interpretation of the principle of equal moral worth, [in which] justice requires social arrangements that permit all to participate as peers in social life” (Fraser 2009, p. 16). Fraser (2009) identifies three social justice barriers to full parity of participation for rural citizens' participation as equals in social life: mal-distribution of economic resources, misrecognition of cultural differences and human potential, and misrepresentation or exclusion from decision-making processes. Applying Fraser's (2009) conceptualization of social justice (see Roberts and Green 2013 for critique) to rural education requires attention to the just distribution of resources, the recognition of the inherent capacities of rural people, and the right to equal participation in democratic processes that lead to opportunities to make decisions affecting local, regional, and global lives.

This multi-dimensional conceptualization of social justice contrasts with existing approaches that privilege distributive approaches that are exclusively economic in focus and thus unresponsive to rural social or geographical space (Roberts and Green 2013). The goal for economic approaches is often to overcome funding inequities in order to enable rural children to demonstrate mastery of benchmarked standards; standards that by definition actively erase the particularities of place and thus are insufficient as a singular approach to redress inequities (Roberts and Green 2013). While improved performance on standardized tests intended to measure one's potential to contribute to economic globalization (might) suggest more fair distribution of educational resources, the pedagogy of erasure (Eppley 2011) with which these assessments are associated reinforces obstacles to the parity of participation required for justice. This does not mean, however, that the antidote is a contorted view of place-based education implemented as a parochial pedagogy willfully blind to regional, national, and global contexts and the relevance of local places to other systems. A critical pedagogy of place engages the multiple geographical contexts of one's “situationality” Freire (1970/1995) by making relevant the “cultural, political, economic, and ecological dynamics of places” (Gruenewald 2008). As Garth Boomer wrote in 1999 (p. 52), teaching as a “pragmatic-radical” means to teach “both for and against the current valuing system”. Heather Zimmerman and Jennifer Weible's (2016) work exemplifies such an approach with a dual emphasis on scientific meaning making and local watershed experiences.

In this Forum contribution, I use “Learning in and about Rural Places: Connections and Tensions Between Students’ Everyday Experiences and Environmental Quality Issues in their Community” (Zimmerman and Weible 2016) to explicitly position rural education as a project of social justice that seeks full participatory parity for rural citizens. While a critical pedagogy of place offers an explicit emphasis on the role of education in the transformation of rural places (Greunewald 2008), Fraser’s (2009) framework enables analysis more specifically about the *barriers* to the transformation of rural places into just spaces where rural people exercise their human rights to parity of participation. In particular, I use this this place-based study to emphasize the potential of Fraser’s (2009) *associational* forms of justice, recognitive and representational, that are frequently ignored in favor of distributive approaches (Roberts and Green 2013). This approach enables a focused engagement with my colleagues’ doubts and questions about rural schools and communities: *Are rural places hopeless? Do rural schools matter?* I understand the comments as expressing the need for more emphasis on associational forms of justice in rural schools and communities.

Overview of the study

Zimmerman and Weible describe the engagement of teens from one rural poverty-impacted school in an Appalachian community in a place-based watershed inquiry. An explicit goal of the study was to find out how the students made use of their own watershed and experiences and knowledge as resources to consider the impact of each activity on the health of the watershed. The students’ funds of knowledge (González, Moll, and Amanti 2005) about the watershed were not only assumed but actively resourced for learning. The students drew on their existing funds of knowledge (González, Moll, and Amanti 2005) about a familiar place to develop new understandings about the watershed, and also to reflect on the ways in which economic and leisure activities impacted the health of the watershed. The students were supported in their learning of new scientific knowledge about the watershed by their existing knowledge and experiences. Though the students were not yet ready to act collectively, many identified immediate and future individual actions.

Using place-based education to balance the scales of justice in rural places

How can science education develop the talents that will enable the dismantling of obstacles to social justice in rural places? Zimmerman and Weible’s work is illustrative of pedagogy that speaks to the struggle for recognition, representation, and redistribution.

Recognition: *Are rural places hopeless?*

Recognitive justice asks *who counts* as having legitimate, yet distinct, identities deserving universal respect and membership as peers (Eppley and Shannon 2015). Such recognition confers status that affords the recognition of cultural differences and fair treatment among groups within societies. Status justice “seeks to take into account the students’ cultures and their communities to counter the previous lack of recognition and associated forms of cultural domination” (Roberts and Green 2013, p. 768).

Zimmerman and Weible describe science education that recognizes the relevance of local communities in teaching and learning. The teachers intentionally designed the watershed project to foster scientific learning about environmental issues and connect to the students' lived experiences with the watershed. Students' experiences, prior knowledge, and fellow community members all "counted" as resources for learning science content in a way that helped them to see the connections between the health of the watershed and the well being of their community. The teens used scientific thinking alongside their cultural understanding to understand the challenges facing their community and the relevance of those problems to their everyday lives. The centering of the curriculum on rural places and people makes a stark contrast to standardized curricula and suggests to students that rural communities "count" as places worth understanding, transforming and preserving.

Representational Justice: *Do rural schools matter?*

Representative justice asks *how will decisions be made?* Dismantling barriers to representative justice requires the involvement of groups in decisions that affect them in order to rectify a previous lack of political representation (Roberts and Green 2013). Representational justice considers the political stage on which fairness of distribution of resources and recognition of difference can be weighed. How can all peers participate as equals within the relevant environments of the issues to be addressed (Eppley and Shannon 2015, pp. 59–73)

Although the teachers in Zimmerman and Weible study "sought to develop an action-oriented mindset focused towards issues impacting their personal source of water," the authors make it clear that, for a variety of reasons, the students failed to identify strategies of collective action most obviously associated with representational justice. Still, there is learning reported in the study that suggests the students' development of democratic decision-making discourses. The students not only expressed concern about the impact of human actions on the environmental health of the watershed, they connected the economics of energy production and agriculture with the environmental impact of these activities. With understanding bolstered by first hand knowledge of the community, the students engaged in research and civic conversations about human use of the watershed, development, and pollution. Additionally, they demonstrated a sense of environmental stewardship as they expressed concerns about the impact of human actions on the environmental health of the watershed over time, identifying water quality as "key issue" for the future. Furthermore, these ideas were developed more or less independently in the absence of models or explicit teaching.

Distributive Justice: *What should rural places contribute?*

Distributive justice asks for just allocation and distribution of resources and addresses the fairness of the economic impacts of policy: what resources are allocated, in what amounts, and does that distribution seem fair (Eppley and Shannon in 2015)? A common social justice approach to inequity in rural schools, distributive approaches often seek to overcome economic differences between urban and rural (Roberts and Green 2013). In this case, the watershed is the resource under consideration. The watershed is a valuable and contested resource coveted by a number of groups for distinct reasons. Julie expresses her understanding of this clearly: "We as humans use the watershed for many things: drinking water, industrial purposes, and we even use them as a source of food." Those vying and

profiting for the resource are located both outside of the community and locally. Outside companies use the water for fracking to aid in the extraction of natural gas. Less profitable local interests, on the other hand, need the water for drinking, farming, recreation, and subsistence hunting and fishing. The human activities in total impact the amount and quality of the resource (water) that remains to be distributed locally.

Although local residents benefit in particular from jobs in energy production (at least temporarily), some of the students in the study questioned the fairness of the return for the community's investment of its resources. Sean wrote: "Before this I wouldn't think twice about a gas line in the middle of a stream but now that I realize that the gas line is destroying the streams' buffering capabilities. I might look into it more." Cherylyn not only demonstrates her understanding of access to fresh water as a global issue, but also considers the negative impacts of energy extraction on the stability of the watershed in the near future: "It made me think that watersheds are very important seeing how only a small percent of fresh water is accessible throughout the world. I will admit the watershed won't be the same in the next 5 years [due] to large amounts of drilling for natural gas and other ways to get resources now." The students in Zimmerman and Weible's (2016) study found that the watershed is negatively impacted by pollution and erosion, and they connected this to economic and recreational activities located locally and from outside of the community. A few students further considered the ecological consequences of the current patterns of watershed usage. Their new awareness led to questions about how their most prized resource ought to be distributed.

Concluding thoughts

The teens demonstrate that the work happening in this rural school clearly *does matter* in the education of this group of soon-to-be-adults preparing to seek representational justice for rural communities. While I agree that "Models of civically engaged scientifically literate citizenry need to be explicitly included alongside the environmental sciences content and practices to evoke behavioral changes related to sustainability" (Zimmerman and Weible 2016), the authors offer compelling evidence about the potential of place-based education as a tool for participatory parity. The work described here has the potential to educate informed and thoughtful citizens prepared to advocate for a role on the political stage so that rural places might have more equitable participation in local, regional, national, and global matters.

Education is our best hope to dismantle obstacles of parity of participation for rural places. Located within a history of exploitation in rural places, the teaching of science that seeks parity of participation via consciousness-raising conflicts with powerful, official discourses that work actively to silence alternatives to hegemonic norms (McHenry-Sorber personal communication). Such norms currently determine who has a place at the table, how decisions are made, and what rural places will contribute. An example of this is the debate over the Next Generation Science Standards (NGSS 2013) in West Virginia. State Board of Education members revised the standards' language about the role of fossil fuels in global warming at the behest of a board member who suggested that we're on a "global warming binge" (National Center for Science Education 2015). <http://ncse.com/news/2015/04/science-standards-adopted-west-virginia-0016287>).

Within a difficult national and local political context, the teachers in this study engaged the students' existing knowledge about the local watershed in order to consider the impact

of human activity on its current and future health. More broadly, the goal of the teachers' work was democratic participation in matters of community development. The teachers ultimately aimed to capitalize on the symbiotic link between the school and its community in order to improve the quality of life for its current and future residents. This kind of consciousness-building building is necessary preparation for rural citizens to join the ongoing struggle for cultural recognition, political representation, and equitable distribution of resources in the struggle for social justice. Science education that engages students with their immediate ecological context while simultaneously engaging with the socio-cultural and economic contexts of their inquiries will be critical to this task. This task implicates not only teachers, but rural educational leadership as well (McHenry-Sorber and Provinzano forthcoming). As the authors of this study (Zimmerman and Weible 2016) found, pragmatic-radical teaching (Boomer 1999) that engages a critical pedagogy of place (Gruenewald 2008) is difficult work, and is especially so when taken up by individuals.

The teachers' interest in critical pedagogy and experience with this study positions them as (potential) critical leaders of place:

A critical leadership of place is leadership that specifically aims to improve the quality of life in particular communities. Leaders with a critical leadership of place support community as a context for learning, understand that schools and their communities are inextricably linked, and that the ability of each to thrive is dependent upon the other. They work to conserve what is beneficial to the well-being of students, families, and communities, while actively leading efforts that address the challenges and/or contradictions found in the local context (Budge 2006, p. 8).

Katherine Budge's definition maps easily onto a conceptualization of teacher-leadership. How might teachers doing similar place-based work in rural schools embrace and promote not only their critical pedagogy of place (Gruenewald 2008), but also their critical leadership of place (Budge 2006) in ways that can build alliances with other teachers and community members? Existing frames for collaboration exist such as the Bread Loaf Teacher Network (<http://www.middlebury.edu/blse/bltn>) and the Rural School Innovation Network (<http://www.ruraledu.org/cms.php?action=rsin>). Social media offers opportunities for connections as well. Making place-based work more common in rural schools requires as well a shift not only in classroom-level pedagogy, but also a shift in school rural leadership. Placed-teaching and learning will occur only within organizational contexts where it is valued as a viable alternative to standardized teaching and learning (McHenry-Sorber and Provinzano forthcoming).

Rural communities are facing new and persisting questions about mountain top removal (Fraley 2007), hydraulic fracking (Schafft and Biddle 2014), logging (Sherman and Sage 2011), factory farming (Shannon 2003), and meatpacking (Broadway 2007). Communities' collective negotiation of possible answers to these questions requires equal parts scientific knowledge and developed human potential of students to dismantle the obstacles to participation in order to balance the scales of justice in rural places.

References

- Boomer, G. (1999). Pragmatic-radical teaching and The Disadvantaged Schools Program. In B. Green (Ed.), *Designs on learning: Essays on curriculum and teaching by Garth Boomer* (pp. 49–58). Canberra: Australia Curriculum Studies Association.

- Broadway, M. (2007). Meatpacking and the transformation of rural communities: A comparison of Brooks, Alberta and Garden City, Kansas. *Rural Sociology*, 72, 560–582. doi:10.1526/003601107782638701.
- Budge, K. (2006). Rural leaders, rural places: Problem, privilege, and possibility. *Journal of Research in Rural Education*, 21, 1–10. Retrieved from <http://jrre.vhost.psu.edu/wp-content/uploads/2014/02/21-13.pdf>.
- Eppley, K. (2011). Reading Mastery as pedagogy of erasure. *Journal of Research in Rural Education*, 26, 1–5. Retrieved from <http://jrre.vhost.psu.edu/wp-content/uploads/2014/02/26-13.pdf>.
- Eppley, K. & Shannon, P. (2015). Literacy education for the Lumps and Divots of smart cities and rural places. In S. Williams & A. Grooms (Eds.), *The politics of educational opportunity in rural contexts* (pp. 59–73). Charlotte: Information Age Press.
- Fraley, J. (2007). Appalachian stereotypes and mountain top removal. *Peace Review: A Journal of Social Justice*, 19, 365–370. doi:10.1080/10402650701524931.
- Fraser, N. (2009). *Scales of justice: Reimagining political space in a globalizing world*. New York: Columbia University.
- Freire, P. (1995). *Pedagogy of the oppressed*. New York: Continuum. (Original work published in 1970).
- González, N., Moll, L. C., & Amanti, C. (2005). *Funds of knowledge: Theorizing practices in households, communities, and classrooms*. Mahwah, NJ: Lawrence Erlbaum.
- Gruenewald, D. (2008). The best of both worlds: A critical pedagogy of place. *Educational Researcher*, 32, 3–12. doi:10.3102/0013189X032004003.
- Howley, A., & Howley, C. (2000). The transformative challenge of rural context. *The Journal of Educational Foundations*, 14, 73–85.
- Howley, A., & Howley, C. (2014). Making sense of rural education research: art, transgression, and other acts of terror. In S. White & M. Corbett (Eds.), *Doing educational research in rural settings: Methodological issues, international perspectives and practical solutions* (pp. 7–25). New York: Routledge.
- Kristof, N. (2012). Profiting from a child's illiteracy. *The New York Times*. http://www.nytimes.com/2012/12/09/opinion/sunday/kristof-profiting-from-a-childs-illiteracy.html?_r=0.
- Lewis, O. (1961). *The children of Sanchez: Autobiography of a Mexican family*. New York: Random House.
- McHenry-Sorber, E., & Provinzano, K. (forthcoming). Confronting rapid change: Exploring the practices of educational leaders in a rural boomtown. Leadership and Policy in Schools.
- National Center for Education Statistics. (2013). The status of rural education. Retrieved from http://nces.ed.gov/programs/coe/indicator_tla.asp.
- National Center for Science Education. (2015). Science standards adopted in West Virginia. <http://ncse.com/news/2015/04/science-standards-adopted-west-virginia-0016287>.
- NGSS Lead States. (2013). *Next generation science standards: For states, by states*. Washington, DC: The National Academies Press.
- Roberts, P., & Green, B. (2013). Researching rural places: On social justice and rural education. *Qualitative Inquiry*, 19, 765–774. doi:10.1177/1077800413503795.
- Sawyer, D. (2009). “20/20.” *A Hidden America: The children of the mountains*. ABC. 13 Feb. 2009 (Television).
- Schafft, K., & Biddle, K. (2014). School and community impacts of hydraulic fracturing within Pennsylvania's Marcellus Shale Region, and the Dilemmas of educational leadership in Gasfield Boomtowns. *Peabody Journal of Education: Issues of Leadership, Policy, and Organizations*, 89, 670–682. doi:10.1080/0161956X.2014.956567.
- Seelye, K. & Zeleny, J. (2008). On the defensive, Obama Calls His Words III-Chosen. *The New York Times*. <http://www.nytimes.com/2008/04/13/us/politics/13campaign.html?pagewanted=al>.
- Shannon, P. (2003). Hog farms in Pennsylvania. *The Reading Teacher*, 56, 688–690.
- Sherman, J., & Sage, R. (2011). Sending off all your good treasures: Rural schools, brain-drain, and community survival in the wake of economic collapse. *Journal of Research in Rural Education*, 26, 1–14. Retrieved from <http://jrre.vhost.psu.edu/wp-content/uploads/2014/02/26-11.pdf>.
- Zimmerman, H. T., & Weible, J. L. (2016). Learning in and about rural places: Connections and tensions between students' everyday experiences and environmental quality issues in their community. *International Journal of Science Education*. doi:10.1007/s11422-016-9757-1.

Karen Eppley is an Associate Professor of Education at Penn State University. Her research interest is at the intersection of literacy education and rural education. Her work explores ideas around contextually relevant teacher preparation, placed literacies, textual representations of rurality, and rural education as a matter of social justice.