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Educating in Place: Mathematics and Technology*

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Educating in Place: Mathematics and Technology^[i]

The power of place will be remarkable. – Aristotle

Mathematics education discourse routinely promotes the idea that mathematics is everywhere.^[ii] That mathematics is everywhere seems a reasonable implication of “We all use math everyday.”^[iii] Modern technology, mostly in the form of computational devices and control systems, is often cited as evidence of the omnipresence of mathematics.^[iv] Computers in our microwaves, wristwatches, and greeting cards all embody a binary expression of mathematics. By this logic, technology in its many forms also must be everywhere.

“Everywhere” typically means “in all places.” If mathematics exists “in all places” then we must understand how something exists in a place, how a place is made, and more basic: how place is defined. For most people, the “place” for post-arithmetic mathematics is the schoolroom. Recent work by Barab and Roth emphasizes the ecological nature of knowing and knowledge as process, not product.^[v] Knowledge, the meaning derived from engagement, is always situated in place. By substituting “location” for “place” in education, *school* has become the context of mathematics. Schoolroom mathematics is viewed as a tool to be *applied in* fictional contexts wrought with oversimplification, such as needing to determine the angle a 3-meter ladder makes with the ground when resting against a wall at a height of 2.6 meters. If it is true that school has become the context for mathematics, how then will a student believe that mathematics is everywhere? How can “we all use mathematics everyday?” The post-arithmetic schoolroom mathematics makes appeals to places outside the school walls yet

does so in artificial, context-as-superficial-wrapping ways. School mathematics becomes its own context and exists traditionally in just one place—school.

Technologies used prominently in mathematics classrooms have similar characteristics. Like “mathematics,” “technology” is difficult to define though it often assumes the status of an “unquestioned good” in the classroom.[vi] “One technology fits all” mentalities are reflected in the near universal use of one brand of calculators in the mathematics classroom. As such, technology too is everywhere yet the technology of mathematics classrooms is rarely used outside of the mathematics classroom. A graphing calculator is the typical technology used for computation and visualization in a math class, yet that same calculator is rarely seen in use outside of the classroom. Computer software use in the mathematics classroom is similar to that of calculator use with the exception being Microsoft Excel. Still, very little literature documents any kind of widespread use of this professional spreadsheet program in the schools. A search of the Education Resources Information Center (ERIC) on the terms “math” and “spreadsheet” yields only 21 hits versus 255 hits for “math” and “calculators.” Despite its in- and out-of-school ubiquity, the spreadsheet remains a rarely used yet relevant technology for the mathematics classroom.

This paper focuses on the tension between the idea that “mathematics is everywhere” and the idea that it is so difficult to craft meaningful, place-based, mathematics lessons. The approach is through an exploration of the nature of place and mathematics, what they are, how they relate, and ways of engaging the two through a pedagogical turn guided by ethics of eco-justice and critical approaches to decolonialization and reinhabitation. This approach, known as “critical place-based

pedagogy”[vii] or “CPBP” herein, is articulated primarily through examples though some effort is made to offer more general strategies for practice. Two ideas motivate this argument. First, that mathematics and the technology used in mathematics classrooms seem stuck in mathematics classrooms but oddly divorced from the place wherein the mathematics classrooms lie. Second, that there is value in opening the ears of our schools and listening to the mathematics of place.

Re-place-ment

Before proceeding further, it is useful to examine Gruenewald ‘s definition of Critical Place-Based Pedagogy. He writes, “A critical pedagogy of place aims to contribute to the production of educational discourses and practices that explicitly examine the place-specific nexus between environment, culture, and education. It is a pedagogy linked to cultural and ecological politics, a pedagogy informed by an ethic of eco-justice, and other socio-ecological traditions that interrogate the intersection between cultures and ecosystems.”[viii]

It is also useful to have a shared sense of what it means to speak of “place (vs. space or location),” “reinhabitation,” and “decolonization.” These concepts are important because the relation of people to spaces can be conceived of as inhabiting, colonizing, harmonizing, and moving between multiple places that are themselves changing over time.

Both “reinhabitation” and “decolonization” are means of addressing humans’ relationship to places. Berg and Dasmann[ix] think of *reinhabitation* as “learning to live-in-place in an area that has been disrupted and injured through past exploitation.”

Similarly, Gruenewald describes *decolonization* as “learning to recognize disruption and injury and address their causes.”[x] Hence, “colonization” may be viewed as the intentional addition of external elements to a physical and/or social space and the establishment of structures and practices to benefit those external elements.

Decolonization emphasizes “living-in-place,” used as a verb. This implies that “place” is more than just a location. Appelbaum describes places as “created when the space has a life that lives beyond the immediate moment.”[xi] This characterization decenters the “human” as both the recorder and motivator of the “life that lives beyond the immediate moment.”

Gruenewald suggests that places are “profoundly pedagogical”[xii] as they contribute in varied ways to the development of our knowledge. This is easily illustrated if the reader imagines a childhood home and visualizes walking around that home. Is it possible to separate memories of that home from events experienced in those spaces? Is the living room four walls, two couches and a table alone or is it the place where Granddad played his accordion while his dog barked in accompaniment?

According to Gruenewald, place has many dimensions and is therefore not without complexities. This may be one reason why education has ignored place. Place has been “undermined and subordinated to space and time so that place has become synonymous with location and disappear[ed] from view.”[xiii] Centering “place” in education seems particularly difficult given the current NCLB trinity of standards, accountability and assessment in their current forms. As Gruenewald writes, the “grammar of school reform lacks a vocabulary for place.” Moreover, the extent to which educational discourse is driven by political discourse and the new economics of

globalism suggests that to the degree that “place” is recognized in education, it has been colonized and inhabited toward destructive and isolatory ends.

As part of the project of globalism, the “local” becomes ever more universal in two ways. First, the ever-present chain department stores and coffee franchises have made travel between locations a movement from one place to the same, in complete ignorance of cultural or environmental differences. Whether in Smalltown, Ohio or Ruralville, New Mexico, one can easily have the same Big Mac washed down with the same Sam’s Choice generic soda. One imagines the hundreds of different forties-era “Greetings from...” postcards that displayed icons found along Route 66, The Great Smoky Mountains, and Needles, California, slowly dissolving into a single postcard littered with national brand names, looking much like a NASCAR entry. And much like a NASCAR car’s trip, travel feels more and more like the starting and finishing points are the same every time.

Second, attachment to a Baudrillardian simulacrum [xiv] of what a town, a house, a farm should look like has meant that town centers, homes, and neighborhoods increasingly suggest a copy of a non-existent copy of some idealized downtown, complete with picket fences, the gingham geese on the porches... The omnipresence of “big-box” stores has provided nearly everyone with access to the gingham geese and garden gnomes, and other archetypal icons of Main Street utopias. The uniformity and universal accessibility of these mass-produced markers of “suburbtopia” is Stepford-esque, where nothing is special because everything is.

Hence, reinhabiting and decolonizing place involves significant work in the face of globalist pressures. But more than simply “learning to live-in-place” by recognizing

the disruptions and injuries of the past, there must be a recognition that while, as Aristotle said, “the power of place will be remarkable,” at the same time the power of humans to disrupt a place has been remarkable. The economic and technological centralization of resources has made possible unbelievable crimes against any idea of place. Baudrillard echoes this: “the social system, just like the biological body, loses its natural defenses in precise proportion to the growing sophistication of its prostheses.”[xv] In the absence of a human subject to educate, Haraway’s metaphor of the “cyborg self”[xvi] and Badmington’s “alien other”[xvii] become important constructs for considering “place” in post-human education. CPBP is not acting with/on humans alone, but the technology+person that is the “post-human.” The critical educator will have to design educational technologies and interfaces to communicate effectively and appropriately to post-human students even as the critical educator seeks to (re)define “post-humanity.” When, as Damarin[xviii] points out, we are in an age where “the student” has become “the user” it is clear that technology is no longer separable from humans. GPS, Google Earth, and mobile communications make it clear that place too is no longer separable from technology and the values it imposes.[xix] The underlying ethos of CPBP makes it necessary to address whether or not creative uses of existing technologies such as GPS can be retasked to address injustices by, say, exposing the effects of strip mining on a community.

Mathematics is complicit in all of this, as a technology of theorizing space and time. Skovsmose describes this as the “formatting power” of mathematics, the ways in which mathematics, both implicitly and explicitly, structures physical and social space.[xix] For instance, the rectilinear layout of many neighborhoods imposes a

Cartesian order on the Earth, fitting houses closely together on their sides so that the socializing spaces are relegated to the front and back of the house, as opposed to shared meeting spaces between the houses. The mathematics of space is used to maximize efficiency (houses per land area as well as dollars per land area for a developer) yet its effects go beyond physical changes to the landscape and include the structuring of community relationships.

Moreover, mathematics' claims to universality and neutrality, or, as Skovsmose describes it, "gentleness and cleanliness,"[xx] are implicit rejections of the importance of the details of place. It does this through the implicit assumption that there is an idealized world existing in contrast to the empirical world. The messiness of life, including the details of place, inhabits the empirical world, while mathematical abstractions exist in the ideal world that can only be accessed through reason. Yet this appeal to a sense of cultural and social neutrality ignores the formatting power of mathematics (in the empirical world) that makes the dual world split untenable. Since the ways in which mathematics is taught communicate the nature of mathematics, mathematics educators must be concerned with these issues.

Yet another complexity of place has to do with the fact that "place" isn't fixed; it is always in motion. Since place involves a lived space, reinhabiting and decolonizing place can't be approached ontologically in any simple way—objectifying place usually has the effect of fixing it in time and space and creating an external "other." Objectification involves defining borders of inclusion/exclusion so that the "object" may be distinguished from its "not-object" others. Objectifying place creates disruption and injury by denying it life and history. If place is to be made central to education, pedagogy

should be the focus of this effort. Since this effort seeks the recognition of disruption and injustice, it is justifiably termed a “critical” place-based pedagogy (CPBP).[xxi]

CPBP is a framework for beginning the work of disrupting top-down models and beginning the process of listening with place at the center of efforts to engage in communities of knowing. It is informed by an ethics of eco-justice and post-human recognition that place exists in spite of humans, not as a result of them. It foregrounds the lifeworlds of students by encouraging a spirit of questioning and listening. It gets around the philosophical problem of applying the mathematical techniques and concepts rooted in a Platonic neverworld to “the real world” by beginning with place and coming to see mathematics as one technology to be used as part of a project of reinhabitation and decolonization. Much of the culture work done in mathematics confronts this problem of the nature of mathematical objects and its relation to absolutism and universality.

Motion and Dis-placement

Critical place-based pedagogy (CPBP) engages specific, lived-places. It is a way to rethink context as a crucial construct in mathematics and technology. At the same time, colloquial senses of “context” as “that which surrounds a core” have strong ties to a humanist centering of man. “Environment” has a similar popular usage and these usages arguably find their way into educational discourse. This goes beyond a discursive location of humans at the center of context or environment, but is instead an hierarchical expression of humans as having the highest value in any context or the environment. There is no defensible basis for making such an assignment of value.

Technology also has a troubled relationship to context—it has been used *as* a context as well as to *supply a context*. In mathematics education, for instance, the importance of “making connections through meaningful contexts” has translated into an over-reliance on “word problems” or, vaguely, “applications” that leave the mathematics content unchanged and unquestioned but “dressed” as simulacra. Most of the attempts to “apply” the math, to “use” the technology, are more simulacra than simulation. The implied “original” never existed, or if it did, it was not part of the students’ experiences. This happens in part because of the number of “simplifying assumptions” that must be made to make the mathematics useable. While this is not a problem for the Platonically minded mathematician who never thinks of the non-existence of a circle, for all but a few of the students in our classrooms, Train A never leaves Albuquerque traveling at a rate of 45 miles per hour.

Making contextual assumptions involves the exclusion of variables and parameters through a value-laden determination of importance. These can involve physical constraints like wind resistance or the deformation of a ladder under the weight of a human, but often they involve value-laden assumptions about social or cultural phenomena. Consider a frequently used proportional reasoning problem having to do with comparing the relative costs of two different mixtures of coffees (1.5 pounds for \$7 versus 2.4 pounds for \$11). In determining which coffee is the better purchase, factors such as whether or not the coffee is organic, or if a purchase supports a local merchant are considered outside the scope of the problem. A critical pedagogy of place involves careful consideration of the assumptions used, especially those concerning place. Teaching the coffee problem without examining the assumptions involves teaching the

underlying assumptions implicitly.

David Jardine[xxii] warns of this when he talks about “curricular tourism,” or the suburbanization of curriculum – ideas sprawling, reaching out to the superficial parts of supposed “applications.” A recent activity sent home with my daughter for homework serves as an example. The activity involved coloring and cutting out paper drawings of three scoops of ice cream, each of which had a single-digit number on it. The three scoops of ice cream with, say “7,” “3,” and “9” on them were then pasted as a triple-scoop onto a paper ice cream dish. The sum, “19,” was then written on the ice cream dish. Finally, a cherry was colored red and glued to the top to leave nothing to the imagination except what the numbers and the sum had to do with ice cream. Perhaps there is a similar “technological tourism” at work in our efforts to find ways to use calculators and other technologies in the mathematics classroom. Just as the ice cream is brought in as an appeal to children’s stomachs and then math is somehow sprinkled on like bent sprinkles, the technology is brought in first and then the problem is created for it to solve. The method and the content are caught in a chicken-and-egg problem of which should come first.

The criticism of current mathematical reform efforts as “a mile wide and an inch deep” has strong ties to this notion of a sprawling curriculum and to the kinds of curricular tourism teachers and students engage in. Leaving unquestioned here the ways that this rhetoric communicates “depth” as a higher value than “breadth,” it is not difficult to see how curricular tourism would be a natural fit in a globalized society. Globalism is, at its heart, about tourism and the freedom of movement (of the select) between and among places.[xxiii] The unlucky (non-select) are vagabonds, stuck in place

without means of mobility. A curricular vagabond never sees the sprawl of ideas because the lack of opportunity for movement is the denial of freedom to make curricular pilgrimages—to relocate to a better “live-in-place” by changing place. The curricular tourist and the curricular vagabond each suffer as a result. Instead of wanting students to have a “mathematical worldview,” we should instead help them to have a “placeview of mathematics” as a means of better understanding place and disruptions and injuries to place. Mathematics can’t change place directly. In fact, a CPBP of mathematics isn’t only a means of addressing injustices in place, but rather a means of addressing mathematics (and technology) through place, as the following examples demonstrate.

Place Holders

CPBP in mathematics education currently has only a few existence proofs. Long, Bush, and Theobald report on two excellent uses of CPBP in mathematics.[xxiv] First, in Craig, Colorado, middle school teachers orchestrated unique math-science lessons on the banks of the Yampa River. Working with the Colorado Department of Wildlife, students conducted a watershed study that involved mathematics in many different ways, including statistics. Temperature, alkalinity, and invertebrate population tests required simple correlation analysis. Students learned how mathematics could improve the quality of the Yampa River, thus improving the quality of life and economics for the Craig Community while learning important mathematics and science in authentic contexts.

The example of Craig is not typical. What is typical is the strange hypocrisy that mathematics educators on the one hand promote the omnipresence and omnipotential of mathematics in everyday life, yet on the other hand seem to find it nearly impossible to

articulate meaningful contexts of application that aren't oversimplified to a point of absurdity. In an ironic twist, the television show NUMB3RS, simultaneously proclaims that "We all use math every day" yet repeatedly showcases how trained criminal investigators have to hire a research mathematician to solve their problems.

What is truly remarkable about the Craig, Colorado students' use of mathematics is not the ways in which they applied mathematics to place, but rather the ways in which place was applied to mathematics. Mathematics gained importance and meaning to the students because of place, not the other way around. Mathematical techniques were pedagogy, a means of learning, not an abstraction underlying the natural and social order of the Yampa river.

The second example comes from Howard, South Dakota where high school students conducted a local cash flow study of their community of about 900 residents in rural Miner County. Students conducted a town meeting with the local business owners and other important members of the community and asked community members to track the intimate details of their spending habits. With a 64% response rate, students used statistical software to analyze the data and determined that people from Howard spent most of their income in nearby larger cities. The Howard residents responded to the report by spending more money locally. The county auditor estimated that the students had engineered a \$6-7 million infusion into Howard's economy.

The Howard example casts light on the nature of the conflict that mathematics educators have lived involving maintaining the faith that mathematics is important, that it adds meaning and utility to people's lives, and that "we all use math everyday" while at the same time never straying from the section-by-section march through the textbook to

invest class time in pursuing the issue of what meaning (personally, collectively) underlies the mathematics content. If we all use mathematics every day, if mathematics is truly everywhere, then it should be visible in a small-town central Appalachian classroom. A student (or teacher) shouldn't have to search for long to see relevant mathematical meaningfulness (or meaningful mathematics). It isn't clear that this is the case in practice.

CPBP is a way of reversing this dynamic by beginning with the idea of place and seeing mathematics as a meaningful technology for describing and addressing obstructions and injustices. It is a way of decolonizing the models of curricular and technological monopolies and reinhabiting the lived spaces. This is far more easily said than done; *this is hard pedagogical work*. Remembering something that has been forgotten or neglected often is hard and frustrating. CPBP involves the admission that place speaks to us—it tells us about our mathematics, our technologies, our institutions.

Current high-stakes testing and curricular despotism make difficult the kind of work done by the Howard, SD students since a freedom to explore, observe, and create takes time and energy that might otherwise be spent preparing for tests. How can place be heard from so far away? Moreover, our rush to categorize communities as “rural” or “urban,” as “poor” or “affluent,” has made easy the substitution of “location” for “place” in education. Part of the decolonization work we must do involves exposing the assumptions made in “frameworks for understanding poverty” and the workshops done in their name, such as the messianic attempts to “save the children of the poor.” [xxx] A common approach involves promoting technology (and specific brands and types of technology) as a cure-all solution to “low-achieving” schools.

Resting Place: (in)Conclusion

Appeals to the universality of mathematics pervade popular culture, school classrooms, and standards documents with their appeals to “mathematics for all.” The use of technology in mathematics education has been a flashpoint topic, yet professional educators and national organizations seem largely supportive of the use of technology generally. Technology has taken on the character of an unquestioned good in mathematics education discourse. It is important to note that “one technology fits all” mentalities are reflected in the near universal use of a single brand of calculators in the mathematics classroom, even if it is beyond the current project’s ability to explain. It demonstrates that technology too is everywhere yet the specific technologies of mathematics classrooms are rarely used outside of the mathematics classroom. Critical place-based pedagogy offers a way of rethinking mathematics education and technology with a stronger recognition of the appropriateness of a technology to some people in some place.

Things without place are lost. We are educating “out of place” and, as such, we are out of place. Critical Place-Based Pedagogy is an approach to pedagogy that focuses on countering pushes toward corporate homogenization of the places in (and through) which we live. CPBP is rooted in an ethics of respect and concern for the environment and human’s part within it – an “ecojustice.” CPBP is not a method for recapturing a nostalgic myth of the past, nor does it spring from archetypes of the “noble savage” who lives in idyllic harmony with nature. Rather, CPBP is an approach to the *here* and the *now*. Modern technology is not inherently good or bad, pro- or anti-“place.” Mathematics

and technology should be expressions of place.

Part of the responsibility of institutions of higher education is to prepare teachers in a way that regards place. Future work should consider ways to engage pre-service and in-service teachers in professional development in CPBP. This may involve more anthropological methods including a different direction for action research projects. Yet another problem that must be considered is the practical problem of whether or not CPBP can take root given the current move toward the universalization/corporatization of education. The focus on “efficiency” as the primary measure of educational effectiveness complicates finding the time and resources necessary to begin the work of CPBP. University-school partnerships and grants may make some of this possible. Finally, the problem of how to teach place is troubling. Teacher preparation programs typically draw students from many different places and then help them to find jobs in yet another varied set of places. Future work in CPBP applications should consider if “place” should be considered a proficiency as has “multiculturalism.” If so, can it be taught (or learned) generally or will case studies and immersion experiences help preservice teachers to respect place and its role at the center of studies? How do/should the ethics of place get communicated?

Enacting CPBP is not easy. Moreover, attempts to prescribe methods in any general way seem anathema to the project of celebrating the specifics of places. Nevertheless, some general starting points and guidelines present themselves in the literature and the examples cited above.

- Teachers cannot do it alone. It takes community members, students, parents, policy makers and administrators to support CPBP.

- Engaging in place and reflecting on the pedagogical implications takes time. Teachers and others involved in shaping place-based programs need the time and freedom to learn and wonder in place.
- Identifying injustices is the first full expression of a critical place-based pedagogy. This is done by cultivating a sense of humans living as part of a place and by reflecting patiently and with an open mind about the institutions and practices that exist in a place.
- Reinhabiting a place involves acting to change the experiences within a place to make them a fuller expression of ethical practice.
- Sharing knowledge and experience with others has long been a core value of teaching, but in light of CPBP it is reshaped to be an act of humility and consensus-building.

Clifford Geertz[xxxi] reminds us, “no one lives in the world in general” – we live and teach in specific places. A pedagogical turn to place through the principals and strategies above offers a principled way of addressing injustice in a way that doesn’t separate human injustices from environmental injustices.

[i] The author thanks Peter Appelbaum, Arcadia University; Craig Howley, ACCLAIM; and Troy Richardson, Cornell University for their helpful comments and suggestions.

[ii] June 2005 NCTM High School member Update “CBS Series NUMB3RS Added to New Season.” Available for download at

http://www.nctm.org/news/releases/2005_06numb3rs.htm .

[iii] Tagline from the CBS series *NUMB3RS*.

[iv] Gail Fitzsimons, *What Counts as Mathematics?* (Dordrecht: Kluwer Press, 2002)

[v] Sasha A. Barab and Wolff-Michael Roth, “Curriculum-Based Ecosystems: Supporting Knowledge From an Ecological Perspective,” *Educational Researcher* 35, no. 5 (2006): 3-13.

[vi] Cuban, L. 2001. *Oversold and Underused: Computers in the Classroom*. Cambridge, MA: Harvard U. Press

[vii] David Gruenewald writes beautifully about CPBP in several papers including:

“Foundations of place: A Multi-Disciplinary Framework for Place-Conscious Education,” *American Educational Research Journal* 40, no. 3 (2003): 619-654

(hereafter denoted “AERJ”); “The Best of Both Worlds: A Critical Pedagogy of Place,” *Educational Researcher* 32, no. 4 (2003): 3-12 (hereafter denoted (ER)); and “Resistance, Reinhabitation, Regime Change,” *Journal of Research in Rural Education* 21, no. 9 (2006): Available for download at <http://www.umaine.edu/jrre/21-9.htm> .

[viii] David Gruenewald, “The Best of Both Worlds.” *Educational Researcher* 32, no. 4, (2003): 10

[ix] Peter Berg and Raymond Dasmann, “Reinhabiting California,” In V. Andruss, et al.,

Home! A Bioregional Reader, Philadelphia: New Society Publishers, quoted from Gruenewald, 2003, Educational Researcher.

[x] Gruenewald, 2003, Educational Researcher.

[xi] Peter Appelbaum, *Embracing Mathematics* (New York: Routledge, Forthcoming).

Draft sections of the manuscript were obtained by contacting the author.

[xii] Gruenewald, 2003, American Educational Research Journal.

[xiii] *ibid.*

[xiv] Jean Baudrillard, *Simulacra and Simulations* (Stanford: Stanford University Press, 1998).

[xv] From Jean Baudrillard, "Prophylaxis and Virulence," in Neil Badmington (Ed.), *Posthumanism: Readers in Cultural Criticism* (New York: Palgrave, 2000).

[xvi] Donna Haraway, "A Cyborg Manifesto: Science, Technology, and Socialist-Feminism in the Late Twentieth Century," in *Simians, Cyborgs and Women: The Reinvention of Nature* (New York: Routledge, 1991), pp. 149-181.

[xvii] Neil Badmington, *Alien Chic: Posthumanism and the Other Within* (New York: Routledge, 2004).

[xvii] From my informal conversations with Suzanne K. Damarin.

[xviii] This can be seen in the recent experience of a colleague who could gather clear satellite images of his hotel in Paris, France, but could get only grainy images of his farm in rural Ohio.

[xix] Ole Skovsmose, *Towards a Philosophy of Critical Mathematics Education* (Dordrecht, the Netherlands: Kluwer, 1994).

[xx] Ole Skovsmose, *Travelling through education: Uncertainty, Mathematics,*

Responsibility, (Rotterdam, The Netherlands, Sense Publishers, 2005).

[xxi] Others, such as Ole Skovsmose (Towards a philosophy of critical mathematics education (1994). Springer; Aporism and critical mathematics education (1999) vol 4, center for research in learning mathematics) have articulated perceptive programs for critical mathematics education yet they seem lacking in their attention to place.

[xxii] David Jardine "The stubborn particulars of grace." In B. Horwood, (Ed.), *Experience and the Curriculum: Principles and Programs* (Dubuque, Iowa: Kendall/Hunt Publishing Company, 1995): 261-275.

[xxiii] Zygmunt Bauman, *Globalisation: The Human Consequences* (New York: Columbia University Press, 2000).

[xxiv] Vena Long, Paul Theobald, William Bush, "*Place*" *Value: The Rural Perspective* (Occasional Paper No. 3, ACCLAIM Clearinghouse, 2003). Download available at http://www.acclaim-math.org/docs/occasional_papers/OP_03_Long_Bush_Theobald.pdf. I hope to explore virtual places in a future paper.

[xxx] Craig Howley, Aimee Howley, Caitlin Howley, and Marged Howley, "Saving the Children of the Poor in Rural Schools," Paper presented at AERA, San Francisco, CA, April, 2006. Download available at <http://www.acclaim-math.org/docs/wp28.pdf>.

[xxxii] Clifford Geertz, *Local Knowledge: Further Essays in Interpretive Anthropology* (New York: Basic Books, 1983): 262.