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# Review: Re-rooting the Learning Space: Minding Where Children's Mathematics Grow, by Jennifer S. Thom

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comparisons to football fields, the Empire State Building, and by putting a six-foot man next to a glacier thousands of feet taller than him. These powerful images are Balog's way of bringing to life the visible, measurable changes in Earth's landscapes.

This film has a particularly strong visual impact. The time-lapse photography techniques make up for the lack of verbal or scientific explanation available to describe global warming. Witnessing a glacier retract nearly three miles in a year is enough proof that the planet is undergoing a large change that cannot be reversed. Balog's findings indicate the threat of rising sea levels, mass extinctions, and other threats that humans may face in the upcoming centuries.

Although *Chasing Ice* provides visual evidence of climate change, it lacks a scientific explanation of why these changes are occurring. Balog, an expert in geomorphology, fails to acknowledge any potential reasons why the retraction of these glaciers may be normal for Earth's current epoch. A thorough scientific explanation would complement the film's visuals and further educate viewers of the severity of climate change that Balog is trying to communicate.

*Chasing Ice* is a worthwhile film for anyone interested in the earth and the changes it undergoes, whether they are a skeptic or a believer of climate change. Balog's unique way of presenting the global warming phenomenon combines his backgrounds of photography and science, and the end result offers a stunning visual account that disproves the hypothesis that global warming is a myth. This film offers clarity about the effects of climate change on delicate areas of Earth and reminds humans that their behaviour affects the health of the planet. See <http://www.chasingice.com/>

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Jennifer S. Thom. (2012). *Re-rooting the Learning Space: Minding Where Children's Mathematics Grow*. Boston, MA: Sense Publishers. 396 pp.

Jennifer Thom's first single-authored book is an engaging and organic approach to complex learning theory and mathematics. At first glance, the reader is met with an intertextual exploration of mathematics education through ecological sensibility, thought, and diverse ways of knowing. Yet what is most striking about this book is its playfulness, and the ease with which Thom explains concepts. As the reader opens the first page, she/he is invited to consider the living systems of a tree as an analogy of learning systems, and is invited to interact with this book as one might with various parts of a tree: "that any one leaf is neither directly connected to the other leaves nor does one need to view them in any particular

sequence” (p. xi). Through this acknowledgement of parts, Thom also accepts the interconnected nature of mathematics and an ecological sensibility. What follows this initial statement is a key, of sorts, to help interpret the intentional complexity of the text, visuals, font choice, shading, and type-setting.

With the intent to be modular, recursive, and organic, Thom’s book can be interpreted as a dance among the conceptualizations of mathematics educational theory and praxis. Generally, it is organized as an increasingly focused exploration of three interwoven voices: (1) situating Thom’s view in place, space, and time; (2) understanding the metaphorical, historical, and ecological landscapes of mathematics education; and (3) enacting theory and stepping into Thom’s classrooms.

In voice one, Thom helps the reader understand her position through contextualizing her views of ecological and mathematical mindfulness. Leaning on Bateson’s (1980) *Mind and Nature*, Thom resonates with his three realms of ecology: empirical, environmental, and systemic. Her vision is that mathematics is mindfully integrated into education (i.e., systemic) through the study of biology (i.e., empirical) and the reduction of human impacts (i.e., environmental). She weaves a metacognitive narration throughout, eliciting memories of childhood, graduate research, and teaching into a complex and rich matrix of personal voice. At times, this dialogic approach resonates with Kierkegaard’s pseudonymic technique (MacPherson, 2001), where he would respond to himself under different pen names as a way to provide richness and edifying voices to his main theory. Thom publishes personal dialogue as a way to provide insights into the subtleties of her thoughts.

Voice two manifests as portraiture of theoretical approaches to mathematical understanding by elucidating the cohesion and tension between constructivist (linear) and holistic (dynamic) interpretations. Ultimately, Thom posits that mathematics is an embodied experience, nuanced through the “patterns of living as biological and socio-cultural beings” such that it “takes place in the praxis of living in language and its coherence is dependent on those who bring it into being” (p. 145). This introduction of complexity and dynamism into a typically linear education frontier is further educed through the notions of ecological-mindedness. That ecology is part of the classroom experience contributes to the third distinct voice that Thom uses: enacting theory in her classroom.

Throughout the book, Thom’s third voice leans on classroom photography, students’ work, and collected conversations with students as a way to transport the reader from theory to praxis. The latter third of the book is entirely devoted to the deep intersections among ecological mindedness and mathematics, with an overall theme of *embedding an ecological sense of place for mathematics in the classroom*. She tackles this through discussions of time, recursion, worldviews, and relationships, interactional spaces for mathematics through group dynamics, self-study, and physical layout opportunities, and interconnections amongst ecology, educator, learners, and researchers.

Though the playfulness of intertextuality was both enriching and even

engrossing at times, this is also where the chief weakness of this book lies. The publication quality of this book is low, with inadequate layout and typesetting arising as symptoms of poorly rendered images, poorly chosen and clashing fonts, fuzzy text, and confusing titling. This fuzziness seems to affect only pages that share graphics or figures. I felt compelled to skim through some of these sections as I couldn't seem to focus on the images or accompanying text. Also, with deep reference to ecological thought and sensibility, there is a distinct omission of Indigenous knowledge as it relates to mathematics education, though I understand Thom focuses on this area of research in other writing. Finally, an important dialogue was extant from her book on ecological-mindedness. There was some limited discussion of student or educator interaction with nearby nature, outdoor learning, and nature-based mathematics as it relates to the biological, environmental, and systemic processes outside of the school walls. These discussions acknowledged the value and complexity of mathematics as a trans-discipline where "mathematics [to arise]...with the world of human and natural contexts...[encourages] examining, questioning, and watching mathematical patterns emerge in different areas such as biology, economics, and everyday life" (p. 43).

Philosophers, educators, and learners who are curious about intersections and transections among ecological and place-based principles in mathematics educations should find this book valuable. It helps manifest elements of Bateson and Bowers that have been challenging to enact, including supporting pattern-seeking of the connections among humans and nature (Bateson, 1972), engendering ecological metaphoric language while modeling learning (Bowers, 1995), and exploring the interdependence of cultural ways of knowing and ecological understanding (Bowers & Flinders, 1991). Amidst quotations, photographs, and intertextual and creative arrangements of text, this book helps push the edge of scholarly knowledge dissemination into more interactive spaces.

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Alex Loftus. (2012). *Everyday Environmentalism: Creating an Urban Political Ecology*. Minneapolis, MN: University of Minnesota Press. 165 pp.

This book is an imminent critique of day-to-day life; what author Alex Loftus refers to as the everyday. It is an attempt to dismantle the purported false boundaries that separate the natural world from our social world. It is also an investigation of the struggles that moderate the relationships and entanglements that link the social and natural world. It is an exercise in political ecology, which is explained by the author as environmental politics aimed at both our production of environments and the socio-natural relationships that the production entails.

Loftus uses a Marxist methodology. He does so because Marxism gives due weight to the process of change, which is the basis of this book. Loftus performs what he refers to as an excavation of the practical and concrete mediations of Marx, and Marx's privileging of relationships. He also brings into conversation the different ways that post-Marxist thinkers built on Marx's method in their attempt to understand and challenge the world they lived in. There are two rudimentary principles at play in the book:

- *dialecticism*, which Loftus explains as a procedural focus on mediation and relationships, rather than the concrete and static kinds of existence often associated with environmentalism. It is the privileging of process rather than concrete form, and
- *praxis*. Praxis defines reality according to the dialectical interplay between the world and us. It represents a challenge to "common sense" divisions between theory and practice. Loftus explains praxis as "world-changing" ideas emerging from popular situations, i.e., from the actions of women and men that make the world as it is, rather than "shallow theory" and empty doctrine.

The chapters of the book delve into Marxist and post-Marxist philosophy. Loftus excavates elements of both to support his thesis. For example, he explores Neil Smith's critique of enlightenment perspectives that treat nature as a thing divorced from society. Loftus draws from Smith a foundation for viewing nature as a variety of relationships, as something forged through concrete activities. It is the view that nature is produced in specific ways. In the current context, the argument is that nature is a production of capitalist relations.

Loftus also draws from Georg Lukács' immanent critique of the "nature of everyday life." Lukács theory, explains Loftus, provides a profound starting