

Canadian Journal of Science, Mathematics, and Technology Education



Disrupting and displacing methodologies in STEM education: From engineering to tinkering with theory for eco-social justice

Editorial Team: Marc Higgins (University of Alberta), Maria F.G Wallace (Louisiana State University), Jesse Bazzul (University of Regina)

Tentative Timeline

- Accepting manuscript abstracts up until: June 30, 2017
- Sending manuscript invitations: July 30, 2017
- Due date for complete manuscripts: January 31, 2018
- Publication date: June 2018

Word Limits

- **Abstract length:** 500 words without references
- **Article length:** 5,000 words without references

Submission Instructions

- Email Abstracts to post.y.science.ed@gmail.com by June 30, 2017

Across diverse educational spaces there are increasing calls to engage in practices of disruptive methodological *de/sign* to differ and defer that which *design* comes to signify: design as pre-existing, design as separate or separable from other aspects of research, and design as a means to achieve and justify the ends. These approaches critically engage methodological processes to disrupt and displace restrictive norms of dominance which linger and lurk with/in educational research, which left unchecked (re)articulate forms of oppressive power. The question we pose in this call for papers is: *What would it mean to engage in the work of de/signing research which critically disrupts and displaces methodologies in science, mathematics, engineering, and technology (STEM) education for eco-social justice?*

It has been argued many times over, across diverse paradigms and fields of study, that science, mathematics, engineering, and technology (STEM) education practices-as-usual maintain and (re)produce systems of dominance: be it patriarchy, heteronormativity, white supremacy, (neo-)colonialism, able-ism, classism, labour inequity, anthropocentrism, and others. While there has been some work that (re)opens STEM education to eco-social justice, there continues to be lingering referents whose taken-for-grantedness, as Liz McKinley (2000) argues, enact and uphold a form of “masking power with innocence.” How do the the diverse educational practices (e.g., research methodologies, teaching “best practices,” and/or curriculum mandates) we employ in and through

Canadian Journal of Science, Mathematics, and Technology Education

our research practices as scholars of STEM education contribute or work to maintain and privilege the prevailing trajectory of STEM education as Western, white, and patriarchal dominance? Here, we consider STEM education as inclusive of, but not limited to formal K-12 schooling, informal education, undergraduate education, teacher education, preparation of future STEM educators, and/or researchers of STEM education.

In considering the relationship between *design* and *de/sign*, we frame the exploration of the invited question with the dichotomous metaphors of engineering and tinkering. Research “design” can often prescriptively and prohibitively act as a signifier that sutures over the signified processes of designing and doing research. Similarly, engineering is the movement from the ends to the means, whereby the engineer makes appropriate selections from “the discourses of formal logic, and the pure sciences” (Spivak, 1976, p. xix), picking concepts, categories, and constructs already purposed for their process (e.g., research as “best fit” and “best practices”). Consequently, “design” is often employed and understood as *a* method that exists *a priori*, “a stand-alone, instrumental set of research practices” (St. Pierre, 2011, p. 52), that also includes and encompasses all of its conceptual apparatus: be it “objectivity,” “cultural neutrality,” “validity,” or other. Because of the aforementioned ways such constructs and categories often implicitly (re)produce systems of power, this special issue is a call to tinker with/in, rather than engineer, research and educational practice.

In contrast to engineering, “the bricoleur [tinkerer] makes do with things that were meant perhaps for other ends” (Spivak, 1976, p. xix). Through tinkering, bricolage reverses the ends/means hierarchy by privileging the means over the ends or the process over the product, even if this entails the very possibility of not achieving the specified goals. However, because ‘a methodological fabric’ is also a fabrication – a performative and non-separable enactment of the interconnected space between theory, practice, and ethics – methodological design is always already open to deconstruction, politics, and re(con)figuration.

This call for papers invites scholars doing the work of *tinkering with theory*, whether it be interrogating theories intended for STEM, or using theories unintended for that context to enact research in STEM education for social and ecological justice. We are looking for lived, engaged, and critically rich scholarship that tinkers with/in these disciplinary spaces across the various stages of research and/as educational practice: design, delivery, analysis, and dissemination.

The following is a non-exhaustive list of potential ideas for manuscripts:

- Queering “what works” and “what counts” in STEM (teacher) education
- (Re)configured or politicized notions of citizenship education
- Post-humanist perspectives and pedagogies of and in STEM education
- (Un)doing anthropocentrism: from Nature/Culture to nature-culture
- Indigenous ways-of-living-with-nature and/in place

Canadian Journal of Science, Mathematics, and Technology Education

- Thinking with New Materialisms to account for entangled pasts, presents, and futures-to-come
- Post-humanist and/or Indigenous conceptions of Nature as an other-than-human STEM teacher
- Art, as well as the disruption and displacement of the arts/science binary
- Postcolonial considerations of ethics of research participation
- *Accounting for of oneself* as differentially inviting researcher reflexivity
- Deleuzian mappings (rather than tracings), creative ontologies, and rhizomatic forms of research and representation
- Deconstruction and/of metaphysics
- Subjects, subjectivities, and subjectivization in/of STEM (teacher) education
- Critical (re)reading of seminal STEM texts (e.g., Grosz' treatment of Darwin in *Becoming Undone*)
- Decolonizing theories and *un-settling* research and STEM teaching practice
- Critical race theory and curricular or policy document analysis
- Implications of theory-practice as more than theory+practice
- Post-representational practice which disrupts and displaces norms of dominance
- Modes of non-linear, non-hierarchical knowledge-into-practice models
- STEM "Outreach" as within, against, and beyond "burden of the fittest"
- Re-visioning the relationship between dissemination of STEM knowledge and subjectivities (e.g., considering biopolitics, biocapitalism)

References

McKinley, E. (2000). Cultural diversity: Masking power with innocence. *Science Education*, 85(1), 74-76.

Spivak, G. C. (1976). Translator's preface. In J. Derrida, *Of grammatology* (G. C. Spivak, Trans.) (pp. ix-lxxxvii). Baltimore, MD: Johns Hopkins University Press.

St. Pierre, E.A. (2011). Post qualitative research: The critique and the coming after. In N. K. Denzin & Y. S. Lincoln (Eds.), *The SAGE Handbook of Qualitative Research (4th Ed.)* (pp. 611-26). Thousand Oaks, CA: SAGE Publications.