Math-a-POLKA:
Mathematics as a Place of Loving Kindness and . . .

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Abstract:
In proposing this special issue, we sought to open a generative and healing conversation in the intersectionality of love, kindness, mathematics, curriculum and education, offering a call that invited the completion of the sentence, "I imagine/want mathematics to be a place of loving kindness and . . . " In their responses, contributors have highlighted the importance of communication in establishing loving kindness through patterns of caring responsiveness, acts of imagination and empathy, and conversations that matter. They envision a place of learning that values aesthetic and affective engagement in mathematical and pedagogical practices that promote capability and resilience among our students. As guest editors, we each offer our responses to the prompt, exploring "kind-ness" as belonging and challenging readers to expand that further to the "kin'd-ness" of communal relations of multi-species flourishing, thus re-imagining mathematics.

Keywords: mathematics education; curriculum; love; kindness; engagement

Éditorial

Résumé :
En proposant ce numéro spécial, nous cherchions à ouvrir un débat constructif et revitalisant dans les domaines relatifs à l'amour, à la bonté, aux mathématiques, au programme d'étude et à l'éducation, tout en proposant une invitation à compléter la phrase suivante : " J'imagine/veux que les mathématiques soient l'occasion d'une manifestation d'amour bienveillant et . . ." Dans leurs réponses, des collaborateurs ont mis en lumière l'importance de la communication en suscitant l'amour bienveillant à travers des modèles de réceptivité bienveillante, des actes d'imagination et d'empathie et des conversations incontestables. Ils envisagent aussi bien un endroit qui valorise l'esthétique et l'engagement affectif dans les pratiques pédagogiques et mathématiques qui promeuvent les aptitudes et la résilience chez nos étudiants. En tant qu'éditeurs invités, nous proposons chacun nos propres réponses, s'imaginant l'amour bienveillant comme l'appartenance, mais aussi comme un défi offert aux lecteurs d'étendre la bonté plus loin jusqu'à la bonté des relations communes de multi-espèces en plein essor, ré-imaginant ainsi les mathématiques.

Mots clés : enseignement des mathématiques; programme d'enseignement; amour bienveillant; appartenance; réalisations

Intention

We (Steven Khan and Alayne Armstrong) have known each other for over a decade now, first as doctoral students in the same cohort and now as colleagues in Mathematics Teacher Education and Curriculum Studies. In the spring of 2018 at the Canadian Mathematics Education Study Group (CMESG, an annual meeting of mathematics educators and mathematicians as well as teachers and others), we organized an "ad hoc" session—space intentionally left open in the program for emergent or topical conversations that can be proposed by any participant—with the title of Mathematics as a Place of Loving Kindness and . . . (see Holm & Mathieu-Soucy, 2019). The group was small, about five of us altogether, but the conversations were rich, diverse and, we realized, had not (yet) found sufficient purchase in the literature. It was here that the idea of a special issue was first conceived, and Steven agreed to prepare a proposal to see if any journals in Curriculum Studies or Mathematics Education would be interested.

Part of the motivation for the issue was our sense that the scholarly communities of Mathematics Education and Curriculum Studies, at least here in Canada, had increasingly grown apart, with limited interaction amongst the two in any formal or sustained way. The annual Canadian Mathematics Education Study Group (CMESG) meeting typically overlaps with the Canadian Society for the Study of Education (CSSE) Annual Meeting and provides a yearly dilemma for researchers and graduate students about which one to attend. One of our intentions then, was to offer a place where researchers who locate themselves in both communities could engage around an issue we see of emerging importance for practice and research: loving kindness.

On November 7, 2018, our call for papers went out to the Curriculum Studies and Mathematics Education communities specifically and to scholars interested in the intersectionality of love, kindness, mathematics, curriculum and education. In our call, we noted that twentieth century frameworks about the teaching, learning, knowing and doing of mathematics were giving way to emerging sensibilities seeded by a re-invigorated emphasis on human(e) values, grounded in *intentional* and *explicit* practices of mindfully curating attention (Acosta & Adamson, 2017), awareness and action with loving kindness. This mythopoetic (Macdonald, 1981/1995) work of demythologizing and remythologizing the imaginaries in which mathematics education is framed, discussed and practiced is emerging from the amplification of activities among popularizers, proselytizers and policy-makers, and is enabled by networked digital technology. One node, for example, is the invitation to re-imagine mathematics education as being for "flourishing" (Su, 2017, 2020).

In explaining our focus on loving kindness, we noted that it is not restricted to a singular tradition but, in its various interpretations and instantiations across traditions, shares what we believe is an explicit and active opposition to incarnations and material practices of human cruelty, violence, humiliation, shaming and brutality. Gleibberman (2016) notes that "perhaps the ultimate love challenge is to extend toward the one who naturally provokes feelings antithetical to love, anxiety,

and alienation" (p. 57). In our current places of learning, mathematics is often a place that provokes such feelings as hate, distaste, fear, anxiety and isolation.

However, love and kindness may be learned (Centre for Healthy Minds & Healthy Minds Innovation, 2017; Lack, 1969), may be practiced in mathematics at any level (e.g., Duval, 2017) and may be part of the ongoing dynamic of mathematics education (e.g., Ausman, 2018). Many educators have begun to work through their own experiences of traumas, violations, hate, pain, anger, loss and sadness in mathematics education and are bringing to attention the necessary and difficult knowledge (Pitt & Britzman, 2003) of teaching through their own trauma alongside the diverse traumas experienced by individuals. We are reminded that the first and repeated act of kindness is to begin to love oneself. This issue tells stories to nurture new myths that heal in the disciplines, and in particular, the discipline of mathematics—a source of much pain, anxiety and unkindness. We appreciate the risk of vulnerability shared by authors in this issue. We believe it is a risk worth taking in this moment as we seek to create more hospitable places of learning (Ellsworth, 2004) in mathematics.

Our hope is that this special issue will stimulate a generative and healing conversation by scholars who position and locate their work in/across mathematics education, curriculum studies and allied fields. An intention for this issue is to provide an opportunity to engage and connect so as to reduce "connection gaps" (Bruce et al., 2017) that limit language, discourse and imagination across scholarly communities of practice. We took as a cue Williams' (1976/2014) cultural analysis of keywords, as well as Singh's (2017) one-word chapter titles, which seem to function in a similar way, as seen in the following figure.

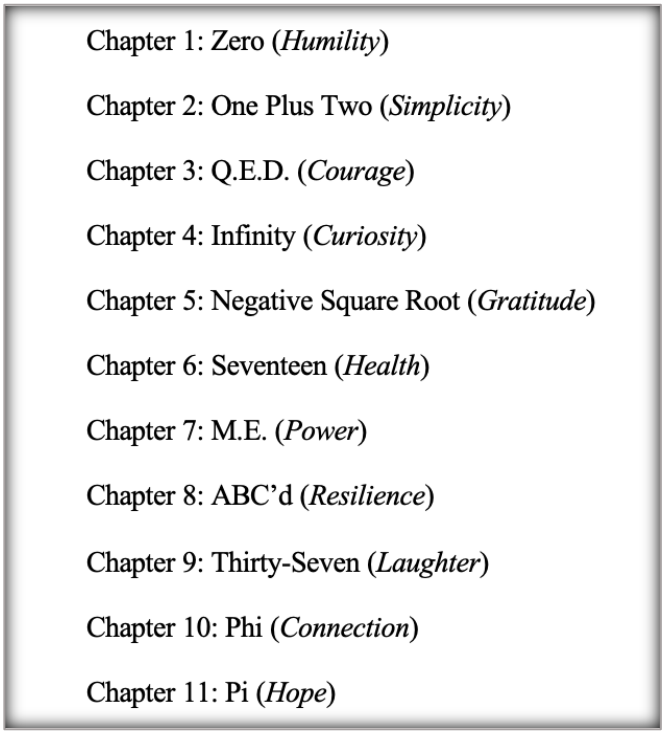

Figure 1. Chapter titles from *Pi of Life: Hidden Happiness of Mathematics* (Singh, 2017).

Prompted by Williams and Singh, in our call for submissions to this issue, we invited responders to begin their thinking by completing the sentence, "I imagine/want mathematics to be a place of loving kindness and . . . " with their own word, phrase or image. Many of the questions in our call remain open, and we list them here to encourage readers to continue to work these into their thinking as they read, and as they stay with, the ideas from this issue.

- *How do you practice loving kindness in your mathematics teaching and learning?*
- *How has this practice emerged, developed and evolved?*
- *When is it hard/impossible to do so?*
- *When might loving kindness be inappropriate?*
- *How does loving kindness re-orient attention, awareness and action?*
- *What resistances arise?*
- *Do socio-material practices and movement (embodied) practices change?*
- *How do we know? Who does it change?*
- *What are some enabling curriculum structures and processes?*
- *What would a kinder math be like?*
- *Are there good examples?*
- *What are the limits of loving kindness?*
- *What do we yet need to know?*

Overview of Special Issue

Our issue opens with a powerful and evocative image from the work of Amanda May (2019). The work, an artistic altering of a mathematics textbook and the life history and sets of experiences that accompany the work—and a very literal aftermath of the life that goes on after math—speaks with the papers in the special issue on the topics of capability, play, flourishing, resilience, unconditional positive regard, bullying, solitude and *mettā.* In May's work, the fold of the spine is a pedagogical pivot—a space for the transforming of a learning self in the making through flow and a commitment to dialogic practice with the remnants of material culture and human lives. Her work also hints at the importance of both mathematics education and curriculum studies going beyond notions of care to engage with the literatures on adverse childhood events and their impacts on learning, and to the need for increased trauma-informed practices in schools at all levels from K-12 and in universities.

May's ongoing work and the complex story she is telling about who learners today are is one that Mathematics Education and Curriculum Studies must take seriously. It demonstrates that the focus of this issue, while framed within mathematics education, is about education, curriculum, pedagogy and study writ large, as places (pivots) for transformation at scales beginning at the human-to-human dialogical relation and expanding outwards.

Josh Markle draws on Nussbaum's (2011) capabilities approach in his description of team teaching a high school course for at-risk and marginalized students, in which students construct a wooden canoe. What binds these students together, he suggests, is "one corrosive thread: the

plurality, pervasiveness and persistence of disadvantage in their lives"—the very same thread May's textbook alteration project invites us to keep always in mind. He offers a hopeful message of the possibilities of autonomy, affiliation and the hermeneutic imagination in the mathematics classroom, albeit one that is not always easy to achieve, and which reminds us of the significance of others and of working with the body in realizing mathematical understanding as a communal activity that foregrounds individual dignity and agency. Although not yet linked in the literatures in mathematics education, the recent work of Fukuyama (2018) on identity and its relationship to dignity and a politics of resentment offers an important extension to the work Markle has begun here.

That mathematics education is a site of struggle for one's dignity to be fully acknowledged and valued in the formation of learner and teacher identities is part of the work that Tasha Ausman takes up, drawing on *mettā* as the cultivation of benevolence, goodwill, love and sympathy. The tensions of teaching and feelings of shame, anger and vulnerability, the recognition of real and perceived micro-aggressions enacted through language, and the need not for withdrawal but dialogue and what Bateson (2018) has termed "warm data" about learners as a part of a complex reparative practice take centre-stage. This paper draws from psychoanalytic approaches, especially the work of Britzman, and resonates with some of the work of Brené Brown (2006, 2012) on the developing of shame resilience and learning to value one's vulnerability—an idea also recently taken up by Singh (2019). Again, such work from outside our traditional domains needs to be in greater dialogue with those of us seeking to do work informed by loving kindness.

Annica Andersson and David Wagner describe and apply a thoughtful, analytical framework they have developed in order to identify how students may demonstrate a range of responsive and dismissive behaviours in their patterns of communication when working together in small groups on a mathematics task, while addressing the question of "how mathematics teachers and other educators create discourses with love in mathematics learning contexts". Honouring the tensions inherent within human relationships, the authors point to the complexities of the interactions involved in doing mathematics and point to an idea worth lingering with, namely, that in learning contexts, mathematics is only ever present through other people. They argue that human communicative acts cannot be seen as only ever one thing, such as love, bullying or withdrawal. The paper serves to anchor the first half of the issue, in which a common theme across the three papers is about the importance of human communication—including both speech acts and acts of listening—and its relation to loving kindness and personal, as well as communal, growth.

Play is the second thematic thread of this special issue and Krista Francis describes mathematical play as a kinder, process-driven approach that offers students a chance to be joyfully absorbed in the task at hand. Her work draws on ideas of flow and flourishing and opens up space for us to ask when play, beauty, truth, justice and love are present in the experiences of teaching and learning mathematics. She argues that "play is vital to our well-being and happiness". Her work is strongly linked to critiques of technical-rationalist discourses in curriculum and education, in which play came to be framed as a waste of (instructional) time and as wasted profit, and which de-emphasized the place of the emotions and body.

Inspired by Ellsworth's (2015) conception of pedagogically non-prescriptive objects, Marc Higgins and Janelle McFeetors explore the abstract strategy game, Santorini, as an educational text. Their work, which connects to several of the other papers in the issue, troubles our notion of what should "count" in mathematics classrooms that are seeking to "pivot" to become places of loving kindness, but in which, following Francis, the pedagogical perception of games and puzzles is one of limited educational (read programmatic or institutional) value. Extending and deepening the work of the preceding paper, they take us back to Dewey and others in valuing the aesthetic and affective dimensions of the experience of the learning self in the making. If, as they argue, "we change because of a well-played game", then we hope that more learners and more mathematics classrooms are enticed to engage in such games.

We close the issue with Janet Baker, Sarah Cousins and Sue Johnson-Wilder, who explore how one model of difference involving variations in systemizing and empathizing can be used to consider how older students may experience math anxiety. They discuss how teachers and learners can support each other to build resilience through the tools of empathetic behaviours, unconditional positive regard and self-regard, and they move school mathematics towards being a place of loving kindness. They offer one of the most explicit definitions of loving kindness in this special issue as "opposition to practices that develop mathematics anxiety, and explicit engagement with practices that promote mathematical resilience". We are able to read much of the earlier papers in the issue in relation to this definition and appreciate the invitation that they make to ensure that learners experience an "ALIVE" rather than a "TIRED" pedagogy.

In the next two sections, the guest editors offer their own reflections on the special issue and their thoughts on the theme of trying to imagine mathematics as a place of loving kindness and . . .

Personal Reflection: Alayne Armstrong

I want mathematics to be a place of loving kindness and belonging. In considering the word "kind-ness", the noun "kind" can be defined as "a group united by common traits or interests" (Kind, 2019). Many people characterize their negative relationship to math in the words, "I am not a math person". In my work as a teacher educator, some students report never having felt like they were math's kind. Others remember feeling akin to math until, at some point—the turning points of middle school, high school and university are commonly mentioned—math turned against them and they were cast out of the group. Here math acts as unkind, the type of gatekeeper that Ausman describes in her article. *You do not belong here; you will not be accepted into these post-secondary programs; you shall not enter these professions.* And this can result in the math anxiety that Cousins, Johnston-Wilder and Baker hope to oppose through the strategy of unconditional positive regard.

The verb "to belong" can be defined as a form of acceptance, as recognition of being of a particular kind. Who belongs to math? The question prompts a string of other questions: Who is mathematical? What does it mean to be mathematical? Who is good enough to belong to math? Here I am reminded of the hurtful remarks uttered by some of the students described by Andersson and Wagner. It's too easy to dismiss someone as not belonging to math, of not being math's kind.

"To belong" also connects to the idea of possession. Some of the other students have mentioned rejecting math before it could turn on them. Plug in the numbers, follow the steps quickly, accurately, without thinking, with automaticity, like a machine—that was not for them. Math was not their kind. It did not belong to them.

The question of to whom math belongs echoes a point raised by Markle: Whom does math serve? Through a social justice lens, whom does math help or hinder? What inequities can mathematics surface? Or what injustices can it be used to downplay or hide? As Andersson and Wagner note, mathematics exists within our social interactions. As such, it provides a context for hurting but also, potentially and hopefully, for healing.

As an adjective, "kind" can be defined as "of a sympathetic or helpful nature" and as "arising from or characterized by sympathy or forbearance" (Kind, 2019). Appending the adjective "loving" to kind-ness emphasizes this positive aspect of the word "kind", and this is what lies at the root of our call for this issue. If you belong to math, and math belongs to you, what are the possibilities?

The articles by Francis and by Higgins and McFeetors explore the notion of play. Francis considers lessons that focus on mathematical process as having the potential for deep absorption and experiences of joy. Higgins and McFeetors explore board games as the site of mathematical engagement that is "play-full". An image of play that our colleague, Susan Gerofsky, has proposed is that of a fishing line (personal communication). Someone who is skilled at fishing will welcome play in their line, allowing it to move and bend, letting it run free and pulling it back in order to tire and ultimately capture the fish. This image suggests how math might work for and with you, a process where mathematical ideas both charge ahead of you and pull back, as you catch up to explore and come to understand them, until math belongs to you and you belong to math.

Personal Reflection: Steven Khan

> The work of the coming decades is not the work of manufacturing, of software development, or of retail seduction, it is the work of caring. Caring for each other and the biosphere. In that care there is the hope of finding new ways of making sense of our own vitality.
>
> (Bateson, 2018, para. 1)

I imagine my mathematics classroom to be a place of loving kindness and for multi-species flourishing. In her article, Ausman invites us to make a different *kind* of mathematics. I think we must go further and set out, following Haraway (2016), to make *kin* once again with our multi-species relatives, through extending the idea of loving kindness beyond our anthropocentric mathematics. In reconnecting with the other inhabitants of the Earth, Haraway (2015) proposes "make kin" as a way to move past our cultural obsession with making kinds (categorizing); this perhaps finds its purest expression in mathematics and in some forms of mathematics education.

Haraway's (2016) multi-species (earth-based) ethics and allied politics acknowledges that we, at the end of the day, have "a mammalian job to do" (p. 161) in navigating our own survival and that of the myriad systems in which we participate. "Making kin", she says, involves collaborating and co-labouring to "make-with—become-with, compose-with—the earth-bound" (p. 161), which involves a

shift to sym-poiesis, rather than auto-poiesis.

In the year since this issue was proposed, several young people (Autumn Peltier and Greta Thunberg are two notable examples) have risen to global prominence in championing the cause of their generation's right to clean water, and a habitable and hospitable climate/planet. While the work in the articles in this issue has been pitched at the human-to-human scale, I want to push readers to imagine a learning environment for mathematics and the types of work that would enable a multi-species flourishing; it is a vision that lies beyond our current quickly receding horizon of minimal "sustainability" for human life.

These and other experiences have prompted a shift in my thinking and speaking away from loving kindness to loving *kin*'d-ness, that is, the recognition of the need for our actions, or rather co-actions, to build communal relations and systems (Mignolo, 2009). Such systems don't "propose a more equitable distribution of wealth, but an horizon of life where wealth is not the goal" (Mignolo, 2009). For Mignolo, "the goal . . . is 'el bien vivir' [the good life[1]] and 'el bien vivir' cannot be attained through an economic system the promotes gains and accumulation at the expenses of human lives and of all living systems simplified under the name of 'nature'" (2009, Section III). This idea finds resonance in Markle's ideas about conviviality and congeniality as goals in mathematics teaching and learning, and it also finds resonance in the ideas put forward by Francis and by Higgins and McFeetors regarding the "value" of play that lies outside the dominant economic calculus.

In taking a first step towards multi-species flourishing in mathematics teacher education, I have been learning about the seven Elder/Sacred/Grandparent teachings—Wisdom, Love, Respect, Bravery, Honesty, Humility and Truth (Empowering the Spirit, 2019)—and the sacred animals that are associated with that teaching. These teachings have been paired alongside the practices of mathematicians in Tracy Zager's (2018) *Becoming the Math Teacher You Wish You'd Had;* these practices include taking risks, being precise, rising to a challenge, asking questions, connecting ideas, using intuition, using reason, proving, as well as working together and alone, all framed towards providing favourable conditions for all learners. The pairings allow for contrasts and, more importantly, connections to be made between two different system-level views of teaching and learning and being.

In a final reflection, one of the teacher candidates with whom I recently worked wrote about respect in relation to becoming a teacher. He offered,

> As we wind up this class in math and consider our last Indigenous teaching of respect and how the buffalo is the representative image here. For our Indigenous here [on the Prairies] the buffalo was life. . . . How I connect this all to these last few days of class is that our professors become our buffalos giving us life as we proceed on in our journey. We each are here to learn from those who have become teachers as we seek too, to become teachers for the next generation. (Student work, 2019, para. 1; used with permission)

[1] While "el bien vivir" translates as "the good life", the concept is more complex, situated and nuanced than the translation suggests.

This notion of a teacher becoming like a buffalo for this learner continues to resonate strongly with me as has my study of the set of rich practices involved in communal buffalo hunting (Brink, 2009). The ideas and contrasts of the learning available and made possible via communal approaches and systems against industrial and plantation models (Beckford, 1972) that now dominate education models is stark. In this thinking, I find connections to the work presented in all of the papers around dialogue, play, the centrality of the body in community, material practices and unconditional positive regard.

Throughout this issue, the importance of deep, attentive, *listening*—to learners, to ourselves, to bodies, to materials, to play and to silence—in addition to listening *for* evidence of one's effects and affects on these learning bodies, emerges for me as a critical aspect for developing or deepening practices of loving kindness. I am reminded of Davis' (1996) closing chapter from a quarter century ago in which he talks, not of revolution, but of inevitable evolution towards more compassionate listening. Davis notes while mathematics is often used as part of the imperative and rhetorical charge to "listen to reason", what he hopes to offer and develop is a "reason to listen" (p. 281).

In the current climate of strained and fraying public discourses around education, and mathematics education in particular, the writers in our issue remind us that, like the buffalo, all parts of mathematics education are life-giving and are valuable in some ways to communal well-being. The next move in "make kin" mathematics a place of loving kindness and multi-species flourishing is perhaps, once again following Gleibberman (2016), to give those who "provoke feelings antithetical to love, anxiety, and alienation" (p. 57) additional reasons to listen (and if not to reason, then to kindness, empathy and love). Is loving kindness enough (sufficient) to achieve whatever ends we imagine for education? That question at least is easy to answer—No, it is not! The other aspect of a mathematical framing, whether it is even necessary, is difficult to answer, but we believe, and we think, that the authors in this issue demonstrate the affirmative.

Finally, one of the pieces of scholarship I have read over the intervening year that continues to have deep resonance for me is the work of Edward Doolittle (2018). In revisiting, from an Indigenous perspective, the Bridges of Könisberg problem (Paoletti, 2011) and the mythic start of graph theory (Carlson, 2017), he asks the following question, which is now becoming a mantra for work I am inspired to do: "After all this time what haven't we done that we should have done?" (Doolittle, 2018, p. 117) to which his answer is, "We have not given thanks" (ibid). The attitude towards gratitude is an aspect of loving kindness that we, in our critical way of being, have not practiced sufficiently and broadly in our learning spaces. We can be "make kin" mathematics for multi-species flourishing. What that looks, sounds and feels like is (as our mathematics textbooks used to say) "left as an exercise to the student".

With gratitude.

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