Loving Kindness and Capability  
in the Mathematics Classroom

Josh Markle  
University of Lethbridge

Abstract:
I imagine mathematics to be a place of loving kindness and capability. Loving kindness is a way of being together, one that affords and sustains capability; and making the (math) classroom a place of loving kindness consists in taking an active interest in one other. Nussbaum (2011) characterizes capability as an answer to the following question: “What is each person able to do and to be?” (p. 18). Drawing on Nussbaum’s (2011) capabilities approach as a broad, normative framework for characterizing individual well-being in the context of teaching and learning, I inquire into my experience teaching a mathematics class in which we cooperatively built 14-foot Prospector canoes. I explore the potential for a hermeneutic pedagogy as a means to both interpret and cultivate capability, and to identify three specific, significant capabilities that emerged in our work together—autonomy, affiliation and hermeneutic imagination—as valuable in and of themselves, yet also essential to cultivating and securing additional capabilities, and to furnishing a space for loving kindness in the mathematics classroom.

Keywords: mathematics education; capabilities approach; hermeneutics; curriculum studies; alternative education; loving kindness
L’amour bienveillant et la capacité dans un cours de mathématiques

Résumé:
Je vois dans les mathématiques une occasion de manifestation d’amour bienveillant et decapacité. L’amour bienveillant est une mode d’être ensemble qui provoque et soutient la capacité; et rendant la salle de classe une espace de capacité veut dire prendre un interêt actif envers l’un et l’autre. Nussbaum (2011) décrit la capacité comme la réponse à la question suivante : “Qu’est-ce qui caractérise ce que chaque personne est capable de faire et d’être?” S’appuyant sur l’approche des compétences de Nussbaum (2011) comme un large cadre conceptuel normatif qui caractérise le bien-être de l’individu dans le contexte didactique, je porte un regard rétrospectif sur mes expériences à enseigner les mathématiques au cours desquelles nous avons construit ensemble des canots de prospection mesurant de quatorze pieds. J’explore le potentiel d’une pédagogie herméneutique comme moyen d’interpréter et cultiver la capacité et d’identifier trois capacités significatives dans nos travaux collectifs—autonomie, affiliation et l’imagination herméneutique—comme étant fort précieux, autant précieuses en soi qu’essentielles à cultiver et à sécuriser des capacités additionnelles, et aussi pour nourrir un espace pour l’amour bienveillant dans la salle de classe.

Mots clés : études de curriculum; éducation en mathématiques; éducation alternative; pédagogie herméneutique; approche des capacités
Notions of harmony and attunement have been pushed into the realms of the quaint and the romantic in a quest for monotonic truth. In terms of mathematics teaching, a principal consequence of this loss of hearing is that learners—those we are to teach—have been reduced to silence; they are objects to be seen and not heard.

(Davis, 1996, p. xxiii, italics in original)

Drop two notes now and then. Play the shadow of it.

—Paul Simon (as cited in Wilkinson, 2002)

Imagine mathematics to be a place of loving kindness and capability. Neither of these are typical qualities of a high-school mathematics classroom, but in this work, I explore the potential for a capabilities approach and a hermeneutic pedagogy to furnish the mathematics classroom as a place of loving kindness. My context is an alternative high school in a small western Canadian city. As a mathematics teacher at that school, I worked with a diverse group of marginalized and at-risk students. These students faced myriad challenges but were bound by one corrosive thread: the plurality, pervasiveness and persistence of disadvantage in their lives. In order for these individuals to move beyond our school and live lives they had reason to value, they needed more than to attain the outcomes set out for them in the curriculum. They needed to be able to transpose what they learned in school into work they valued, to forge positive social relationships that furnished their own autonomy and self-worth, and to use their voices to do so for others. Ultimately, they needed the capability to imagine new ways of living with and toward one another.

In my particular experience, making the mathematics classroom a place of loving kindness happened in a novel context: through Canoe Math, a class oriented around the construction of two 14-foot, wooden canoes and focused on collaboration, communication, and realizing mathematical understanding as bodily skill. In working together, it was soon clear that those objectives were conditional upon the essential capabilities of autonomy, affiliation and imagination—and that these depended on us orienting our class around each other, not the mathematics. We had to create a space by taking an active interest in each other to sustain a space of loving kindness. In this work, I outline the capabilities approach and suggest it as a framework for interpreting understanding and well-being in the context of teaching and learning. I suggest philosophical hermeneutics as a means by which to enact a capabilities approach; and I set out three capabilities that emerged out of working with students in a cooperative mathematics classroom over three years.

A Capabilities Approach to Education

A capabilities approach is a normative theory of social justice and well-being primarily developed by Sen (1980, 1999, 2009) and Nussbaum (1988, 2000, 2006, 2011). It seeks to answer the following question: "What is each person able to do and to be?" (Nussbaum, 2011, p. 18). A capabilities approach takes individuals as ends unto themselves, and because it acknowledges the primacy of the individual, the approach scales easily to school, classroom and student levels. Although both Sen and Nussbaum have contributed meaningfully to the development of this
framework, I defer more often to Nussbaum’s work and her application of the capabilities approach. Robeyns (2003) notes that Nussbaum’s conception of the approach “engages . . . with the power of narratives and poetic texts to better understand people’s hopes, desires, aspirations, motivations, and decisions” (p. 24). An adolescent high school student, particularly a marginalized one, often has little more than hopes, desires and aspirations, which makes a capabilities approach such a fecund interpretive space in the context of teaching and learning. Nussbaum (2011) writes that narrative can allow for a “focus on a wider range of problems and issues, and also cultivate the imagination, producing an acknowledgement of the equal humanity of people” (p. 81).

A capabilities approach makes a careful distinction between capabilities—what people are able to do and to be—and functionings, the actual beings and doings of an individual. Similar to the experiences of many teachers, much of my work in the classroom has been oriented around modelling, observing and measuring functionings, not capabilities. This is not necessarily a fault of my practice, but reflects the nature of capability: capabilities are latent capacities for action and are not easily susceptible to observation and measurement. A capabilities approach ultimately values the individual’s dignity and agency. Functionings are more easily quantified and generalized, but they do not speak to the individual’s capacity for choice. These choices are the ends themselves, and Nussbaum (2011) notes that their “irreducible heterogeneity” means that they “all need to be secured and protected in distinctive ways” (p. 35). The capabilities approach can trace its roots back to thinkers who were also deeply concerned with freedom and dignity: Marx, Mill, Aristotle and the Stoics, among others (Nussbaum, 2011, p. 132). Nussbaum writes that it is useful to think of the capabilities approach as the progeny of “one attractive and enduring marriage . . . between stoic ideas of equal worth of all human beings with Aristotelian ideas about human vulnerability” (p. 132).

Although this approach clearly gives primacy to the capacity for choice and freedom, it also acknowledges the beings and doings (functionings) that constitute a lived life. Nussbaum (2011) notes that children, in particular, should be required to function in certain ways (p. 26). For example, children should receive an education in basic literacy and numeracy. Not only are these capabilities and their associated functionings valuable in and of themselves, they are preconditions for additional capabilities and functionings essential to a well-lived life. But despite the compulsory nature of some functionings, children should still be viewed as agents able to effect change in their lives. Biggeri (2014) writes that a capabilities approach is an apt framework for interpreting the well-being of children because it “considers children not simply as recipients of freedom, but rather as active social actors and agents in their communities” (p. 45). This hints at the complex, symbiotic nature between capabilities and functionings: functioning begets capability. Nussbaum (2011) notes that it is “important . . . not to confine the analysis of education and capabilities to those skills [of basic literacy and numeracy]” (p. 155). A real education, she writes, demands more, in particular, “critical thinking, the ability to imagine and to understand another person’s situation from within” (p. 155).

**On Canoes, Mathematics and the Poetics of Space**

Ours was a small high school serving the most vulnerable youth and young adults in the city and surrounding area. Our mathematics department consisted of only two teachers: I oversaw the
academic streams, while my colleague Brian taught math for trades and apprenticeships. Although we supported many students in achieving success in mathematics, we observed high rates of attrition and failure across both streams and grades. Even more troubling was the fact that many of the instances of success we observed in the math classroom did not seem to transpose into better lives for our students. We knew our math courses were often on the periphery of our students’ complex lives and thus could only do so much, but we also realized we needed to teach and learn mathematics differently if it were to be meaningful.

Although not an intuitive next step, we decided to build canoes. We moved from the classroom to the woodshop and focused on collaboration and communication in our approach to mathematics. It was a beautiful shop: natural light poured through large windows and it was well-appointed with General International machinery, a fleet of woodworking dreadnoughts in shades of sea foam and pea green. With the first group of students, we laid out the plans purchased from a builder in England, a series of meticulously hand-drawn schematics containing hundreds of precise measurements, across a workbench. One of the plans detailed how the planks forming the sides of the canoe were to be cut from a 4-foot by 8-foot sheet of 5-millimeter Okoume plywood, an imported variety of Mahogany commonly used in boatbuilding. The plan was peppered with hashmarks, each denoting a cut to make and measured in millimeters from a single reference point on the sheet. We all studied it in silence. It was a perfect context for problem solving with our math students.

Brian and I quickly realized that team-teaching the course offered us the opportunity to model not only mathematical dialogue, but how to work productively together. The course was offered daily in 90-minute blocks, just like the traditional classroom-based offering that ran later in the day. Students could receive credit for their grade ten, or eleven, required mathematics courses and also for woodworking, entrepreneurship, and if they participated in paddling the canoes at the end of the semester, outdoor education. We sequenced the course in terms of the canoe build, rather than the learning objectives in a program of studies or textbook. Not only was this intuitive, but it helped to retain the authenticity of the problem: we were going to use math in service of something. Each week, we tackled a new aspect of the build and then linked it to a learning outcome in the program of studies. We planned to spend some time going over the intricate plans as a group before moving on to procuring the wood, tools and epoxy we needed. Then we would measure and cut the planks—in no time, we figured, we would have the canoes out on the water. But we were wrong.

In general, students were no more motivated to build a canoe than sit through a traditional math class. We recruited several students, for example, who aspired to carpentry as a profession. Others were directed to the class because they were told it would be fun. We certainly thought it would be, but to be told so was hardly inspiring for many students. By the end of the first week, we had begun to realize that we needed to slow down and refocus on why we wanted to do this work in the first place.

From a curricular perspective, we wanted the students to have a rich, inner mathematical dialogue, to frame and attend to problems mathematically, and to work with each other. Rather than
using direct instruction to introduce a concept, we instead began each day standing around the plans or canoes, discussing what needed to be done and how we needed to do it. Many of these problems needed to be investigated through mathematics, and we made sure to verbalize our questions in mathematical terms. This process begot answers and additional questions from students, and in this manner, we began to establish a rhythmic mathematical patter. If another teacher or administrator wanted to know how the students were doing in math, they did not need to look at test scores. They just needed to come into our classroom and listen.

Although we had access to the shop when we needed it, we had to make use of a small adjacent classroom, formerly a space for a bike repair option and still littered with velocipedic detritus. In the beginning, Brian and I were concerned about the space. It was too small, we thought: with two canoes on sawhorses, it was impossible to move around the room without bumping into each other. There was also no place to sit. It was to become a running joke. When asked about how the class was going, we might facetiously respond with some variation of “The canoes are great, but how are these kids supposed to learn anything if they don't have a desk to sit at?” We tacked up our building plans and a few whiteboards on a section of bare wall, and though we did not realize it at the time, this was to become a hub for dialogue and community building. It was here that we typically planned what to do next and argued vehemently about the intricacies of both woodworking and mathematics.

Our worries about the space turned out to be unfounded. In retrospect, we might not have broken down the social distance between our eclectic group of students so quickly if we had been in the woodshop proper. Over each semester, with each group of students, something began to happen within this space as we talked, worked and lived so closely together, even if it was only for a couple of hours a day. In The Poetics of Space (2014), Gaston Bachelard uses the metaphor of the home to explore the human imagination. In this metaphor, he seeks out “felicitous spaces”, those “space[s] we love” (p. 19). He writes that these spaces have both protective and imaginative value, but that the latter eventually comes to dominate. “Space that has been seized upon by the imagination,” he writes, “cannot remain indifferent space subject to the measures and estimates of the surveyor” (p. 19). I feel I was part of this phenomenon in our classroom: through dialogue and work we came to inhabit the space with all the “partiality of the imagination” (p. 19).

But other changes were happening, both in how our students approached the work and working with each other. We began to see our students connect thinking with their practical and bodily experiences. The sociologist Richard Sennett (2008) writes that there is an “intimate connection between hand and head,” (p. 9) and, through observing our students’ work and talking with them, we became witness to this coupling of the power of imagination with substantial freedom. Although the end-product was pre-determined, students had full autonomy over how to implement and express their ideas and understandings. We began to see a resourcefulness and resiliency in the ways our students approached the mathematics, the canoe build and each other. They were not always friendly to each other, at least not in the colloquial sense, nor were they particularly effusive about the mathematics or the canoe, but they seemed to be becoming partial to how we worked together. It was becoming clear that the meaningful development of skill and
imagination were means by which our students could manifest their coursework in lives they had reason to value.

With respect to working with each other, Sennett again offers insight. He opens his book on cooperation, *Together* (2012), with a poignant photograph: Frances Johnston’s “Making a Staircase” (p. 2). Johnston mostly photographed African and Native Americans early in the twentieth century, often children or young individuals in residential or vocational schools. “Making a Staircase” was taken at the Hampton Normal and Agricultural Institute, a vocational college established in the mid-nineteenth century to educate freed slaves. In the photograph, several young African American craftsmen work to build a beautiful staircase. It is clear they are working together, both from their proximity to one another and the job each has selected to do: one fits a carefully lathed baluster; another fastens a piece of wood paneling into place; yet another burnishes the curved handrail. But they also seem distant from one another, each addressed by and absorbed in the task at hand. Sennett (2012) might describe this sort of harmony as a kind of dialogic capability, which is characterized by a long list of skills including but not limited to “listening well, behaving tactfully, finding points of agreement and managing disagreement, or avoiding frustration in a difficult discussion” (p. 6). Although each individual attends to his own task, all remain bound by the work in “little dramas of deference and assertion” (Sennett, p. 15). In Canoe Math, this sort of collaborative and dialogic working environment was one means by which we attended and responded to the required curricular outcomes in ways that honoured our own lives and experience.

What this looked like in practice depended entirely on individual circumstance. I recall one conversation that began to change my thinking around what we were doing in our Canoe Math class. It was with a girl named Deborah1, a long-time student at our school. Deborah had not found success in traditional high school—she had been to two others before joining ours. Her time in our class marked her fourth attempt at completing her grade eleven math requirement. Our conversation turned to this fact, and I began to probe her as to why she was not only sticking it out in our class, but finding success in math, too. At this point, although it was the second iteration of the class, I was still enamored with the novelty of the canoe.

“Oh, I don’t really care about the canoe,” she said. “It’s cool, I guess, but I don’t really like canoeing.”

Another student, sanding some planks before stitching them together, was listening in. “Yeah, I don’t really like canoes either.”

“Well, why would you do this?” I asked. I was incredulous. These two students in particular had put a lot of extra work into the canoe build. It would have been far easier to take our more traditional class-based offering.

“I don’t know,” Deborah shrugged. “I just like arguing about it.”

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1 I have used pseudonyms for students.
Three Tentative Capabilities: Autonomy, Affiliation and a Hermeneutic Imagination

Reorienting the mathematics classroom around capability requires us—both teachers and learners—to relinquish control. It does not eschew the functionings required of a student in the program of studies but emphasizes an individual’s choice in how and when to realize those functionings. The title of this section suggests a critical aspect of this list: it is tentative, open to argument and highly contingent on context. Walker (2007) interviewed forty adolescent girls in Cape Town, South Africa, in generating a list of capabilities relevant to that community (p. 188). Nussbaum (2011) took a broader approach from the perspective of human dignity and well-being in devising her well-known list (p. 33). Terzi (2007) focused on younger children and their capability to be educated. As Walker (2007) notes, no single list makes a claim to universality; rather, the lists “make claims for the capability approach in education where the focus on capability outcomes is seen as contributing to social justice” (p. 191). Below, I describe three capabilities that emerged out of working with a group of marginalized and disadvantaged individuals in our Canoe Math class.

Figure 1. Three Capabilities and Loving Kindness. Image created by author.

Figure 1 describes three capabilities: autonomy, affiliation and hermeneutic imagination. Each is distinct and irreducible but plays a key role in sustaining the others. In discussing the relationship between respect and inequality, Sennett (2003) writes of the psychologist D. W. Winnicott, who characterized autonomy in terms of recognizing, respecting and valuing difference (p. 120). Sennett writes that this “rhythm of identification and differentiation” serves to develop a “relationship between people, rather than an isolating difference” (p. 121). This requires a reimagining of the
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notion of agency, one that moves beyond strictly individual control and empowerment. We speak
often of developing agency in our students, of creating agents of change who take ownership of
their work. Of course, it is crucial that individuals have opportunities to find work that is meaningful
to them and to convey their understandings in a manner that serves them best. Agency captures
these ideas, but it does not necessarily capture a capability for valuing difference and acting on it in
such a way as to empower one’s self and those around one. Sennett and Winnicott’s characterization
of autonomy is explicit in specifying the importance of developing not simply one’s own agency, but
in furnishing the agency of others, an act that requires an empathic leap. It is this notion of empathy
that is essential to living and working together hermeneutically, to opening ourselves to the potential
rightness of each other (Gadamer, 1989). In Canoe Math, this typically manifested in spirited debate
over how to proceed with the canoe build. Given the space, our students began to listen to one
another, to problematize their own thinking through dialogue with their peers. What we observed
and were a part of was authentic collaboration, a process that reflected the messiness of the work at
hand and the complexity of lived experience. That our students increasingly framed their arguments
with rich mathematical dialogue was a success but a peripheral one.

Autonomy is essential in forming the social bases of self-respect necessary for living and
working with others. It allows for us to relate meaningfully to one another. In Canoe Math, students
collaborated to find and solve problems in a way that reflected the richness and complexity at play in
forming and sustaining relationships. As noted above, autonomy is distinctly related to difference,
and I argue this is true for affiliation as well. The sort of opportunities we offered students to work
together—for affiliation—in our traditional math classrooms were ineffective, in part because they
lacked genuine opportunities for imagination, empathy and respect. These were sterilized practices,
one’s “bent on reducing anxieties which differences can inspire” (Sennett, 2012, p. 8). In those
situations, students might be asked to work in groups on an assigned math problem or to
orchestrate a series of steps through which they might explain a concept to each other, but both of
these contrived means often begot only a pantomime of cooperation. Instead, Canoe Math
emphasized the capability of “choosing the kind of cooperation we want, what its terms of exchange
are, how we will cooperate” (Sennett, 2012, p. 13). In this, Sennett writes, “freedom enter[ed] the
experience of cooperation as a consequence” (p. 13).

Both affiliation and autonomy enabled a reimagining of how we worked together.
Vadeboncoeur and Vellos (2016) refer to a kind of moral imagination and argue that “teachers and
students must engage in the joint imagining of new relationships, relationships that allow them to
participate in the world in new and different ways” (p. 308). This characterization of moral
imagination intimates an element of capability that emerged in the work we did together in Canoe
Math. In orienting our math classroom around an active interest in each other, we were able to
“disclose a different state of things, to open the windows of consciousness to what might be, what
ought to be” (Greene, quoted in Vadeboncoeur and Vellos, 2016, p. 313). We determined for
ourselves how our subject matter translated into lives we had reason to value, both presently and in
the future. Nussbaum (2011) emphasizes the role of imagination in living a rich life with and toward
one another. Instead of withdrawing from a class in which they did not see space for themselves, the
students in Canoe Math began to work innovatively with the materials at hand, to find rewarding problems and attend to them in clever ways, and to reach beyond these notions of creativity and innovation to conceptualize and realize new ways of working and living together. They were cultivating hermeneutic imaginations (Smith, 1999, p. 39).

I qualify this capability as hermeneutic because, to me, philosophical hermeneutics captures not only what this capability looks like, but suggests a means by which one might achieve it. In his book Teaching Mathematics (1996), Brent Davis writes of hermeneutic listening (p. 53). He writes that this is not an evaluative listening in which we take in information external to us, nor even an interpretive listening in which we project our own horizon onto that data, but a listening that entails “an imaginative participation in the formation and transformation of experience through an ongoing interrogation of the taken-for-granted and the prejudices that frame perceptions and actions” (p. 53). Even more succinctly, it is “the participation in the unfolding of possibilities through collective action” (p. 53, italics in original). In our math class, collective action took the form of an active interest in each other.

The alethic nature of understanding in hermeneutics—that in disclosing something, something is undisclosed—is reflected in the complex relationship between functionings and capabilities. As educators concerned not only with the child’s immediate well-being, but with their potential for well-being in the future, we must require certain functionings and evaluate them. But capabilities are pluripotent: a particular functioning discloses only something about the underlying capability, not everything. Working in this way with our students demands we not simply observe what they can do, but interpret why they chose a particular course of action and listen carefully for evidence of eschewed choices. It was a different sort of listening, one attuned not to a specific note, but to its shadow.

Binding together these three capabilities is empathy, which is cultivated through taking an active interest in one another, and which sustains a space for loving kindness. To work with each other in terms of capabilities, we needed to listen to each other and to make a greater effort in understanding one another through loving kindness. The German theologian and philosopher Friedrich Schleiermacher conceived of a hermeneutic theory in which the interpreter could deepen her understanding through empathy. Philosophical hermeneutics acknowledges this and echoes Schleiermacher’s “feeling for the individuality of persons, the realization that they cannot be classified and deduced according to general rules or laws” (Gadamer, 1984, p. 75). To understand each other insists that we both listen carefully and acknowledge a barrier to understanding, one that must be overcome not by scientific method, but “by feeling, by an immediate, sympathetic, and congenial understanding” (Gadamer, 1989, p. 190). It is this idea of empathy—of congeniality and conviviality—that must feature prominently in a capabilities approach to teaching and learning.

A Place of Loving Kindness

Our math classroom was a place of loving kindness and capability, and it was a transformative experience for all of us. The students in Canoe Math were able to meet the curricular outcomes
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through collaboration, communication and practical skill. But more importantly, they realized that they were capable of thinking mathematically and imagining the unique ways mathematics could manifest in lives they had reason to value. One aspect of reimagining ways we might live and work together was the recognition that taking an active interest in each other is reciprocal, that each of our voices furnishes and secures the capabilities of affiliation, autonomy and hermeneutic imagination in one another. All of this depended upon working together hermeneutically, on working within the space consisting of our openness to one another. As Davey (2006) writes, “it is the generative space of the in-between, the space of the hermeneutical encounter, which discloses the reality of alternative possibilities not presently my own but which might yet become my own” (p. 15, italics in original). Working hermeneutically created a space in which we could reorient our math classroom around capability, on what each of us could be. And in a space of loving kindness, the possibilities are endless.

![Figure 2. A Space of Loving Kindness and Capability. Photo by J. Markle.](image)

References


