CHAPTER 8

Conclusions and Implications: The Take Out

At the end of *Math for a Cause*, the teaching team was proud of our work together. Our students learned a lot about social justice through a queered curriculum using critical literacy and mathematics, and we learned a lot about doing this work with middle school students. On our end-of-course survey, we asked students "what does this class mean to you?" As Bryan and I looked at these surveys together, we felt both elated and relieved, as many students shared that they found value in the class and their answers revealed learning gains. Justin Case answered "social changes can be made by everyone," demonstrating that our hope that students would be inspired by the course was realized, at least in his case. Rosette's answer was similar in tone, as she wrote, "I think this class means to put math into social justice, and important things going on around the world." Rosette now saw how math related to social justice and could apply that understanding beyond her immediate community. In the beginning, Rosette related social justice issues to things she had seen in her town, so taking this perspective global indicated a large shift. Sum Dood mentioned the more difficult parts of the class by answering "It is about equality and rights and things that are stupid but true." He later explained in our final interview that "stupid but true" referred to people wanting to ban gay marriage, stating "it's stupid that they can control another person's life." Contemplating the hypocrisy of

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homophobia brought a critical perspective to his already supportive views regarding LGBTQ+ rights.

From the surveys and interviews with our focal students, it was clear that *Math for a Cause* had many benefits for the students. I think many of these benefits stemmed directly from our queered social justice curriculum, which allowed students a lot of freedom for exploring learning without heavily structured procedures from the teaching team. Students played on their edge in secondary stability, moving out of the comfort zone of primary stability, to stretch themselves (as seen in Chapter 4). Students in their secondary stability learned to let go of the need for a singular correct answer to their mathematical questions, as well as learning that many social justice issues are intersectional and require work from multiple standpoints, such as the multiple oppressions faced by transgender People of Color. When rests and planning time were needed, students caught eddies and reentered the current with renewed energy and strategies (described in Chapter 5). Our whole class caught an eddy to reflect on the disproportionate numbers of Black and Latinx people in US prisons as compared to their number in the general population. Students also caught eddies in their small groups when they needed to plan their strategies, such as deciding how to best convince an audience to support same-sex marriage. Students also used eddies to reflect on their own learning and their conceptions of literacy, numeracy and mathematics, and social justice.

There were times when obstacles were greater than their skill or energy levels allowed, so they had to exit the river temporarily and portage around the obstructions (discussed in Chapter 6). When Ashley, Sum Dood, and Justin Case were stuck on an article about Christian opposition to same-sex marriage that was above their reading level, they portaged around the text and found one that was more suitable. When the whole class, including the teachers, were feeling overwhelmed by the heaviness of our subject matter, we asked for student feedback and took time on shore to regroup and recharge. Lastly, students also learned how to roll when tipped over by a difficult concept (as discussed in Chapter 7). This included times when students realized they had made an error, such as the Podcast Boys in their calculations to find a correlation between suicide rates and same-sex marriage laws per state. Students also rolled when confronting their own preconceived notions about race. Below, I will share specific examples of learning gains and discuss how these gains fit into the kayaking metaphor (Fig. 8.1).

Fig. 8.1 A group of kayakers on a river

8.1 New Skills: Students' Literacy and Numeracy Gains

One of the biggest conceptual gains was students' broadened understandings of what mathematics is, and what it can do. By combining critical literacy with mathematics, students were beginning to "read the word and the world" (Freire, 2000) as well as "read the world through mathematics" (Gutstein, 2003). They learned that numbers could be manipulated, beyond the idea that bar graphs can include exaggerated scales intended to create the visual effect of a large change when the change was minuscule. Their newer understandings included that the raw numbers themselves also did not necessarily represent truths, and that the way numbers are presented within an informational text can also influence a reader. Opinion polls could differ depending on time period, sample size, and geographic location. Even if numbers indicated a difference between populations, such as what racial and ethnic groups go

to prison in the largest percentages, by using their critical literacy and thinking skills they could determine that these numbers did not lead to simple interpretations of data. This led to students grappling with ambiguity, thus riding in their secondary stability, more than they were used to. They had to use their other skills—catching an eddy, portaging, or rolling—to navigate the rivers of social justice work.

Looking at the focal students' final interviews (Ally, Jimmy Smith, Mia, and Sum Dood) as well their post-course surveys, it was evident their conceptions of mathematics had shifted from equations with singular answers to something that could be read and interpreted. The biggest changes occurred in students who stayed longer in their secondary stability than their primary stability and were willing to take learning risks, while also taking the time to catch eddies for reflection. Mia, our student who was not particularly fond of math in the beginning, and thought math class was only worksheets and textbooks, ended the courses conceptualizing math as a puzzle. Jimmy Smith declared math as "endless" on his survey. Sum Dood became interested in learning why people believed what they believed, particularly regarding same-sex marriage rights, and wanted to use math to change their opinions. And Ally, who still referred to math in the post-course survey as "putting numbers together and getting an answer" learned that numbers were not a hard truth as she realized there were small differences in polling data despite the similarities of the questions. For Ally, this was a huge revelation.

Other students' responses to the end-of-course surveys indicated the value of combining critical literacy with critical mathematics. Rosette, a sixth grader, answered "describe what it means to do math" with "to use numbers or facts to find out an answer." Here, it is not entirely clear if she is using "facts" as synonym for "numbers" but I think the most likely interpretation is that she has an awareness that numbers and facts are separate, and her wording is a response to using informational articles as part of our math work in class. Ashley, another sixth grader, answered the same question with "solving problems that have to do with numbers." This indicates that she sees math as "having to do with numbers" but this does not mean for her that problems *only* involve numbers. Numbers are part of math, just as words and concepts are.

Of course, there were students who did not demonstrate these conceptual gains, mainly Aiden and Sue Denim. As discussed in previous chapters, these two rarely participated in small or large group dialogues. Even when in the same physical spaces as their group, often intimate

study rooms, they continued to work by themselves or browse the Internet for fun rather than to research their social justice topics. Their end-of-course surveys also indicate a lack of engagement and growth. On the first survey when we asked, "What does it mean to be 'good' at mathematics?" Aiden responded with "someone who get [*sic*] mathematics." On the later survey, he answered "what does it mean to 'do' math?" with the similarly short "add, subtract." Other students answered the earlier question with more thoughtful responses, such as Rosette's response that it means "you understand things well enough to do them correctly, and you feel comfortable with it." Similarly, Sue Denim responded to the question "what does it mean to 'do' math?" with the simple "math equations like 1 + 1." Despite all the different mathematical work he had completed and witnessed, including the Podcast Boys' final Web site, he had not gained—or at least, did not want to share—any new feelings about mathematics. Sue Denim and Aiden stayed in their primary stability, and rarely used eddies as a time of reflection and planning. Because of their determination to stay in the comfort of primary stability, they never learned to roll, and so we were unsuccessful in preparing them for the flexibility necessary for social justice.

8.2 New Gear: Students' Conceptual Gains for Social Justice

Along with students' gains in critical literacy and critical mathematics, they also demonstrated conceptual growth in the way they thought about social justice. In the first interviews with the focal students, they indicated that at school social justice was discussed in terms of community service and accepting differences. From our lengthy exploration in class, they were able to think deeper about social justice in their community. Sum Dood, as previously discussed, began asking more "why" questions regarding people's beliefs. Mia told Bryan and I that she had begun to notice more social justice issues while her parents watched the news on television. Jimmy Smith stated that before this class he "never really pondered it much," showing that for him eddies were particularly helpful.

The surveys also indicated conceptual growth (some of these were shared in Chapter 4: Students Moving Out of their Comfort Zones: Primary and Secondary Stability, and so will not be repeated here). In our pre-class survey, students struggled with the question "Describe

social justice in your own words" and I gave them the examples of fairness and equality. Predictably, seven of the ten participants used one or both of those words in their answer. However, when they completed their final survey they had more practice articulating their definitions, and we also asked them "How do you feel about social justice?" Izzie, a seventh-grade girl, answered "social justice is problems that are not fixable most of the time" and she felt that "social justice problems need to be fixed." This (unintentionally) queer juxtaposition puts her definition and feelings in seeming opposition to each other; however, it also shows that even though she sees social justice as difficult, she is able to believe in its necessity and hold two divergent thoughts at once. This skill of balancing realism with hope is needed in social justice work to prevent advocates from feeling discouraged or experiencing burnout. Justin Case also showed this hope, when he answered that social justice is "fairness for all" and he felt "it should be everywhere but is not."

As with the curricular gains, there were students who did not show as much growth in how they conceptualized social justice. Ally, our most concrete thinker, unsurprisingly told Bryan and me in her interview that at the end of the course that she "knew everything I knew before…and my opinion didn't change." Aiden and Sue Denim, also unsurprisingly, did not demonstrate any changes in how they thought of social justice between their pre- and post-surveys. Aiden defined it first as "the rights for equality" and on the post-survey as "the equality of people in social justice." Sue Denim first defined it as "equality and fairness" and later as "being equal with the race and gender and social stuff," which at least references some of the examples we explored in class. They both simply answered "good" to what they felt about social justice, a marked difference from their classmates' reflective answers. All three of these students demonstrate that when one stays in their primary stability, few conceptual gains are made. For Aiden and Sue Denim, this also demonstrates their lack of participation with the class. While group members would help each other while in their secondary stability or when faced with obstacles, Aiden and Sue Denim were often stopped at the bank, or even out of the river completely, going in their own direction that deviated from the course. Aiden and Sue Denim's written work and participation in class did not indicate they caught eddies to reflect. In contrast, Ally did reflect when stopped in eddies, both by herself and with her group. This difference, as well as Ally's willingness to be in her secondary stability regarding mathematics as the course progressed, is likely why she had more conceptual gains that Aiden and Sue Denim.

8.3 Kayaking the Course: Implications for Queer Pedagogy

When I began this study, my research questions stemmed from existing literature on queer pedagogy, social justice pedagogy, critical literacy, and critical mathematics. Through my analysis, I found that while it is possible, and useful, to look at how each kind of pedagogy worked separately in the course, it was more interesting to me to investigate how they worked together. Through a queered curricular lens, critical pedagogies for social justice can work together to cultivate "conscientization" (Freire, 2000), meaning a critical consciousness. Visualizing this combined theoretical framework and how it manifests in the classroom as a kayaking metaphor allows me to describe the depth of experience that resulted from using these pedagogies together. This book, then, demonstrates that queer pedagogy, though it can seem elusive and difficult at times, can be utilized in a physical classroom just as it can be used to think through curricular concepts in the abstract. Queer pedagogy works well in a social justice classroom as critical pedagogies have the shared values of questioning, dialogue, and reflection.

One of the primary tenets of queer pedagogy, stemming from Britzman's (1995) work, is the questioning of boundaries and limits. In our course, I tried to remove as many curricular boundaries as possible: combining disciplinary boundaries between literacy and mathematics; giving students freedom to create their own mathematical questions and figure out how to solve them; and removing scaffolding from lessons when possible. As discussed in previous chapters, sometimes we had to add boundaries back in as students floundered when there was no structure, or at least significantly less structure than they were used to having in a math course. Queer pedagogy in practice may allow teachers and students to consider which rules and boundaries make sense in the moment, which can be bent, and which can be abandoned all together. As part of this, we can consider what rules have become normative and expected (Butler, 2004), and what are the implications of this accepted normalcy. Such considerations must be ongoing. Even though humans seem to have a desire for structure and boundaries, maybe in classrooms we can form a flexible structure with removable boundaries that will allow movement and freedom in order to reach new learning possibilities.

While it may seem impossible to remove all boundaries in our social world, particularly those around social constructions of identity categories like sexuality, gender, race, and class, using queer pedagogy can help

us imagine a new sociality. Yet because our laws and social protocols are created based on identity categories, taking the categories away, or altering the protocols surrounding them, sends some into a tailspin. Take, for example, the conservative political backlash in 2016–2018 coming on the heels of same-sex marriage rights becoming federally legal in 2015. Conservative lawmakers are trying to infringe on queer people's rights in other ways, such as allowing religious organizations to discriminate against queer people who want to foster or adopt children, which also causes activists to worry about queer children placed by those agencies (Burgess, 2018). Another concern is the refusal to declare conversion therapy illegal (in which so-called therapists try to "cure" queer people of their sexual orientation), even though the science behind it has been debunked by psychological experts. However, youth continue to embrace queer identities at higher percentages than previous generations (Sleczkowski, 2017), which could indicate that the pendulum will swing back to more progressive legislature when they begin voting and holding positions of power.

Perhaps if more teachers can queer their pedagogy and allow students to see the flexibility inherent in the curriculum, this will transfer to a flexibility in worldview. Warnick and Stemhagen (2007) posited that teaching students that there was a single right answer in math may translate into a moral belief of singular answers. I think this danger is inherent to any curriculum that relies on singular answers. Students need to learn that morals are not a simple dichotomy of good and bad, and that people who might seem good in most aspects can still be racist, homophobic, transphobic, sexist, classist, or ableist. By asking students to investigate social justice issues in depth, guided by their own inquiry more than instructor guidelines, they may begin to think of these issues as complex. Like Sum Dood in our class, they may wonder why homophobic people hold those beliefs and seek to investigate their reasons in order to better refute their arguments.

8.4 Future River Trips: Implications for Other Classrooms

This classroom of middle schoolers dedicated to learning about social justice and spreading their messages to a wider audience has several implications for teaching, and in the following sections I will discuss how it relates to critical literacy, critical mathematics, interdisciplinary

teaching, teacher education, and education research. In my queer framework, these implications imply a queer futurity (Muñoz, 2007), and the course left a "queer residue and simultaneous potentiality" (Muñoz, 2007, p. 357) on my own ideas for teaching and research. The residue impacts how I teach my own pre-service English teachers currently, and I hope its potentiality will have an impact on other pre-service or in-service teachers, as well as education researchers, as you go on your own river trips.

Critical Literacy

Watching our students tackle texts on difficult subject matter reinstilled my belief that critical literacy is a necessary component of all English Language Arts classes, and that future educators of all disciplines should learn how to incorporate it into their literacy lessons. When critical questions were scaffolded appropriately for our students, including space for reflection, most could successfully complete a critical reading of texts on their reading level. They were also able to gain new critical informational literacy skills as they sifted through information for their mathematical questions. Critical literacy allowed them to discern what information was appropriate, what information was distracting or irrelevant, and how to relate this information to their self-created task.

Numerical literacy should also be a component of an English course using critical literacy. Students need our help in analyzing the numerical data within informational texts, both in print and online, especially regarding polarizing issues. They also need help applying their critical reading skills to numbers, as many (like Ally) may see numbers as truths and so do not see how they can be interpreted in the same way as words. Critical literacy can allow students to figure out when authors are using numerical data to support their opinion or further stereotypes. This numerical inclusion can be aligned using the Common Core State Standards (CCSS Initiative, 2018a) that ask students to cite textual evidence to support their analysis (CCSS.ELA-LITERACY.CCRA.RI.) or to analyze an author's purpose or point of view (CCSS.ELA-LITERACY. CCRA RI.6). There are also standards about evaluation that are particularly relevant to this work, such as "integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words" (CCSS Initiative, 2018a, CCSS.ELA-LITERACY.CCRA.R7) and "evaluate the argument and specific claims

in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence" (CCSS Initiative, 2018a, CCSS.ELA-LITERACY.CCRA.R8). While content standards are decidedly un-queer as they assume learning outcomes can be standardized, teachers are mandated to follow them, and they can be used to align any social justice lessons.

Continuing with other practical advice, our students seemed to prefer when the critical literacy questions were in the form of a chart rather than a list of questions. This may have been because the boxes where they wrote their answers seemed smaller and less intimidating than the blank spaces below the questions on the first worksheets we tried. It could also simply have been that for this elective course, they tired easily of worksheets that mimicked typical core classes, and the chart allowed them to see all the questions on a single side of the page. No matter how I designed the handouts, however, student talk was far richer than their written work. I encourage teachers to try to jot down notes during students' discussions, or record snippets of conversations to capture this dialogue. Teachers could also use oral assessments or have a graded discussion or group presentation instead of a traditional essay.

Critical Mathematics

The students in *Math for a Cause* indicated that students are interested in learning how math can benefit their everyday lives and be used for social good. They also demonstrated that they need scaffolding to help them make the cognitive leap from the math they are used to (i.e., practice problems on worksheets) to seeing the creativity that is possible in mathematics. When teaching with a critical mathematics framework, students can learn that numbers can be read like texts, and they can begin to apply the math they learn in the classroom to situations outside of school. While this may not have happened for all of our students, Mia did share in an interview that she applied math skills from her "regular" seventh-grade math course to working through problems in our course.

I also hope that this course demonstrates for math teachers that it is okay to have a classroom that seems chaotic from an outside perspective. This chaos led to our delightful results, and students' freedom and playfulness with the material allowed them to view math in a new light. Skills were still addressed by a teacher but in a generative way, as our students had a lesson on calculating and comparing averages and

percentages based on their needs, and they then learned to read this data in context. Our students also learned that they could draw conclusions and support arguments through mathematics, something many had never realized was a possibility. In a classroom with pressures of standardized testing, it may be difficult for teachers to try our messy teaching style, but incorporating more inquiry elements and giving students the freedom to think through the steps needed for their calculations on their own allowed them to try new skills and recognize their mistakes in context, which aided their understanding of the mathematical skills themselves.

As with the ELA standards, the CCSS also offers ample opportunity to align lessons like those in this book. The first anchor standard for mathematics is "make sense of problems and persevere in solving them" (CCSS Initiative, 2018b, CCSS.Math.Practice.MP1) which fits with our metaphors of secondary stability and kayak rolls. Another fitting standard is "construct viable arguments and critique the reasoning of others" (CCSS Initiative, 2018b, CCSS.Math.Practice.MP3), which our students did by creating their mathematical questions to support their arguments about social justice. They critiqued the reasoning of authors who interpreted numerical data to prove points. This anchor standard also emphasizes the importance of questioning, which our students did in small groups through reflective dialogue. The standards are broad and can, and I would argue, should, be used to create rich mathematical instruction that incorporates social justice issues.

Interdisciplinary Teaching

Our course was interdisciplinary by nature, so I hope that readers see the value of combining disciplines in the classroom. This interdisciplinarity is a more accurate picture of real life: we do not move in a world compartmentalized by artificial boundaries such as school subjects. By queering the classroom in this way, students benefit greatly as they are able to see the connections between their classes and apply their knowledge to investigating broader social problems. Interdisciplinary teaching has been used by social justice educators (North, 2009), has been shown to increase student learning (Jones, 2010), and is cited as helping improve teachers' professional school culture (Sandholtz, 2000). *Math for a Cause* could have easily included more collaborations, such as a social studies teacher to investigate primary documents about our issues,

a media specialist to help students navigate online texts, and a science teacher to discuss how science was used in the past to categorize racial groups in derogatory and harmful ways through eugenics, or the long-term health implications of being denied basic preventative care. While adding more instructors can also lead to problems, such as when our teaching team of three would accidentally give students different ideas for research, pooling expertise allows students to see the connections within their areas of knowledge.

I also feel it is just as important to actually write curriculum outside of your discipline as it is to collaborate with other disciplinary experts. In conducting this post-critical ethnographic study, I learned a lot about my own strengths as an educator and how English can help me teach other subjects as I found myself writing math worksheets on marriage equality. For me, one of the strengths of English Language Arts as a discipline is the emphasis on different interpretations of text, and different modes of expression (e.g., essays, creative stories and poems, multimodal projects). This is how I approached the curriculum I created for *Math for a Cause*, which led to subverting some students' expectations, such as when I asked them to create problems from a range rather than a singular number. This new curriculum experience also took away some of my fears about math. I now have increased confidence in my numeracy skills and my ability to understand numerical reasoning, though I still do not identify as a math educator and avoid counting when at all possible. Like our students, I learned to see mathematics as a discipline that could incorporate creativity and interpretation, something I realized I had previously only attributed to the humanities. This knowledge opened my eyes not only to mathematics as a discipline, but also allowed me to see English in a new way. These realizations strengthened, and queered, my teaching as I have loosened my own boundaries and limits around academic disciplines.

Teacher Education

In my secondary English methods courses, I harness these lessons, and I ask my pre-service teachers to complete an in-class activity where I challenge them to create an outline for a lesson or unit plan using English and another discipline with which they are unfamiliar. Picking a discipline relating to a second major or minor is not allowed. My students have come up with ideas for an English, history and health lesson

using fictional and historical texts to explore attitudes toward mental health; an English and math unit investigating the geometry of the architecture described in the nonfiction text *The Devil in the White City* (Larson, 2004), which is about the architect of the 1893 World's Fair; and an English and biology unit where students produce a creative writing piece about a biological change using an idea from current scientific research. The possibilities for this work are endless and allow teachers to be creative and collaborate with colleagues, which would result in rich student learning experiences. I hope my students have the chance when they are in their own classrooms to try some of these imagined collaborations. For other examples of interdisciplinary collaborations in secondary English, see the work of Bull and Dupuis (2014) and Pekter and McAskill (2014).

Any disciplinary methods course in a teacher education program could include a similar activity. Pre-service teachers could research interdisciplinary units conducted by teachers in their home discipline for ideas and investigate which curricular standards would best align with these lessons. Elementary students could read about integrating music with mathematics like An, Capraro, and Tillman (2013) and social studies and art teachers could read of a program combining the two subjects in a middle school program using parent volunteers (Epstein & Dauber, 1995), for example. There are plenty of models for pre-service teachers of varying subjects to explore. Ideally, teacher education faculty across disciplines could bring their students together and have them collaborate in person. However, this is understandably difficult for logistical reasons such as class scheduling conflicts, and fitting in required curriculum to meet state licensure requirements, and is something I have yet to attempt. In the future, I hope to work with colleagues on this experiment.

Research in Education

While social justice in education has been a popular topic of research since the 1990s, most published research is on teachers and teacher education, and fewer research studies look to student work or interviews students to learn from their first-hand perspectives (for some examples of social justice education research in PK-12 settings, see Pennell, Boyd, Parkhouse, & LaGarry, 2017). While researching how strong teachers incorporate social justice in their classrooms is vitally important, so too

is speaking with their students to learn how this teaching is perceived. In my case, I would not have known the impact of our queered curriculum if I had only conducted observations and looked at student work. Without the audio recordings and interviews, much of the student learning would be invisible. This book, then, is a testament to the strength of post-ethnographic methods for in-depth analysis of queer and social justice education. Perhaps future researchers could conduct longer ethnographies and follow students who received social justice-based instruction to find out the lasting impact of these teaching methods. Are these students more compassionate? Are they more active in social movements than their peers? Regarding our queered curriculum, the field of education would benefit from more studies of queer pedagogy in action as there are fewer of these than social justice education studies. Do the students in queered classrooms carry their expanded notions of learning and academic disciplines into future schooling experiences? Are they more likely to question other boundaries in their lives, including those that are used to govern us? Longitudinal research is needed to investigate these questions.

Another methodological query I have when reflecting on this work is the use of audio recorders with young adolescents. When I have interviewed adults, they usually ignore the audio recorder, or perhaps only make comments to the recorder when they have said something they do not want included in a report. Sometimes in a focus group of adults, they may silently signal each other when someone says something another considers indiscrete by raising their eyebrows or slyly gesturing toward the recorder as a reminder. However, our students interacted with the recorders in a delightfully pointed way. When I told them I wanted to record their conversations, they shouted in glee. I showed them all how to use the devices, told them I would like it if they left it on, but also assured them they could turn it off whenever they wanted. For some, the recorder became a proxy for me. They knew I was listening to the recordings, so sometimes they would talk directly to me, such as saying "sorry Summer" when they were getting off topic in their conversation. Rosette, Ally, and Ashley used the recorders during the first unit to model how they were being good students and would read their articles aloud. Quickly, however, they stopped trying to prove how well they were behaving and the recorders captured their sillier conversations. I also noticed that for some students, the recorder was a fun extra member of their group only when they were confident in their work; some

felt the recorder was a creepy spy when they did not think they understood their readings or could not figure out how to complete their math problems. The presence of the recorder was experienced differently, then, depending on if students were confidently in their secondary stabilities, or if they felt stuck by a river obstruction.

The importance of engaged play was evident in the way students interacted with the recorder and leaves avenues for future research in the usefulness of this tool in classroom learning. The Podcast Boys, as their moniker indicates, imagined an audience and created a show using the recorder. During the second unit, Ashley, Justin Case, and Sum Dood mused about making a time capsule that included their recording and used this imagined scenario to wonder if people in the future would think it was strange that same-sex marriage was not allowed, or even if they would think marriage at all was strange. This was the closest students came to queering the institution of marriage itself, and only came about through their engaged play. Rather than distracting the students, these moments of playfulness kept them focused on the material in ways I did not anticipate and could not have planned. These moments were spontaneous and likely flourished because of the privacy the small groups had to work away from constant teacher supervision. Future researchers could investigate if giving students recorders to talk to and play with while they work aids in their learning.

Lastly, I hope that other researchers will find the kayaking metaphors explored here are useful tools for investigating student learning. There are many other kayaking terms to explore: tandem kayaking, thinking how specific paddle strokes might represent learning techniques, or kayaking on a lake compared to a river. Tandem kayaking, meaning using a boat that has positions for two people, could serve as a metaphor to investigate students working in pairs or students who have a constant instructional assistant, such as some students in special education. The special education teacher can sit in the stern position of the boat (the back)—which is typically the steering position—to provide guidance along the river route. When the student gains more confidence, they may switch to the steering position and the teacher can sit in the bow position (front), continuing to support the student by paddling and assisting in moving the boat to support their learning mindset. When paddling a tandem kayak, both paddlers must communicate with each other, so this metaphor can be useful when teaching teamwork. Colloquially among paddlers, a tandem is referred to as a "divorce boat," as bickering with

your kayaking partner and blaming them when things go wrong is common. In a tandem, respectful communication and teamwork is key to success. My dad says that when he is instructing beginners in paddling a tandem boat, he reminds them that the other person is doing the very best they can, same as they are. If something does not go as intended, you should remain calm and supportive of your partner, and think how to best proceed before acting impulsively. This is a lesson that many students—and adults—would be well served by learning. As this example demonstrates, there are many additional opportunities for expanding the kayaking metaphor in education research.

8.5 Catching a Last Eddy: Personal Reflections on the Journey

Like our students, I also left the course changed. At the take out, I had a clearer idea of what middle school-aged students could handle and for what kinds of things they needed support in regard to queering boundaries and critically reading and investigating social justice topics. Students, especially those new to topics of social justice, need ample time for reflection at all stages of the learning process. Waiting until the end of the unit to ask what they are feeling and thinking does not allow for the crucial reflection needed throughout the learning process, such as while reading a difficult text, that allows the students to grapple with the new information. Additionally, I learned the benefits of moving out of my primary stability of normative classroom practices and staying in my secondary stability as a teacher-researcher, even though being uncertain was scary and frustrating at times. I had to roll my kayak when hit with unexpected challenges such as realizing the students needed more support on certain math skills than anticipated, and to portage when the teaching team realized we all needed a break from the heaviness of discussing racism. Catching frequent eddies to reflect, either solo or with my teaching team, helped me to constantly assess how the students were doing and what we could do to improve. As we reached the take out for *Math for a Cause*, I was left feeling that we had positively affected this small class of students and felt hopeful for their futures.

I do not want to imply, however, that this is a stereotypical teaching narrative that ends in enlightenment of the teacher after overcoming struggles (Miller, 1998). I frequently struggled to let go of my own boundaries of what I thought teaching, researching, and learning meant.

My difficulties are echoed by other teacher-researchers who want to queer their classroom while navigating expectations of students, parents, colleagues, and administrators (DePalma, 2010; Bower-Phipps, Powell, Bivona, Harmon, & Olcott, 2017; Whitlock, 2010). Teaching queerly is risky and may bring censure. In my case, I was fortunate to conduct this research at a school that embraced new ideas, and I am aware other teachers may have to do this work less openly. Teaching queerly can also affect teacher confidence due to its difficulty; no teacher wants to feel their work is messy, especially as we are trained to have carefully planned lessons with recognizable, measurable outcomes. However, in this case, I feel the risk was worth it.

Our students grew, gained practical and conceptual skills, and hopefully left with increased awareness of and interest in social issues. Those who were not afraid to be in their secondary stability, caught eddies when needed, rolled their kayaks when they could and portaged around obstacles that were too great for them to surpass ended the course with expanded notions of social justice, literacy, and mathematics. Their growth surpassed my expectations. Working with the students and teaching team of *Math for a Cause* taught me that students' and teachers' expectations for learning and research can be queered, and that this queering can lead to unexpected rewards and revelations. There were, as previously discussed, students who did not demonstrate great growth as they stayed mostly in their primary stability or did not even get in their kayak at all. This demonstrates the need for more differentiation, to allow students multiple entry points to the water. Sometimes choosing their path down the river is not enough; Sue Denim and Aiden may have benefited from taking a different river entirely. Perhaps future researchers can experiment with offering even more choice to reluctant kayakers.

8.6 Beyond the River: Possibilities for Future Lessons

While same-sex marriage, which was a large part of our class, is currently legal on a federal level, unfortunately there are still many possibilities for investigating social justice issues in the classroom. At the time of writing, Donald Trump's regime is exacerbating a wide array of social justice issues which students will need support discussing, such as creating

immigration policies that cruelly separate children from their families and attempts to limit the freedom of the press by revoking access to reporters who question federal policies. Queering the curriculum around these issues can allow students to investigate them on their own, with teacher support when needed, and allow them to foster critical literacy skills to practice sifting through information to decide what they think and feel about these situations. Teachers can encourage students to enter their secondary stability to navigate rapids of contention.

This work may take students beyond a river course where everyone is headed in the same direction—i.e., investigating similar topics in a similar time frame—and may be more similar to paddling on a bay. There, students can paddle along the shore to investigate issues close to their community, such as how racism manifests in local laws and interactions with law enforcement. How do different communities on the banks report the news? What numbers are considered and used within texts to make these points? Students may look beyond the banks to what happens at the point where the river widens into the bay, and how that river effects the plant and animal life in the water. This metaphor can relate to national environmental issues of pollution like the Dakota Access Pipeline. What happens when communities from the river clash with those of the bay, especially when the current changes at the transition point? Whose voices are heard, and whose are ignored? Advanced students can venture farther into the open ocean where waves are larger than in the bay, where they will need advanced skills and gear to navigate the waters safely. This can represent students taking their knowledge into the world, where there are more factors outside of the teacher's control. Students may join or organize a protest in their community, contact government representatives, or do other work in the world outside the classroom. Here, they will have to interact with people of different ages and experience, which can make for rougher waters as they are pushed more consistently outside of their primary stability. If teachers have helped students to practice rolls and other skills, students can thrive in these risky environments. Queer pedagogy and social justice pedagogy can be dangerous as we ask students to confront difficult concepts, but it is our job as educators to prepare them for the unexpected when they leave our classroom. Letting them take some risks while under our care can ease their transition to other bodies of water when they leave our river at the take out.

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