QUEER STUDIES & EDUCATION
SERIES EDITORS: WILLIAM F. PINAR
NELSON M. RODRIGUEZ · RETA UGENA WHITLOCK

Queering Critical Literacy and Numeracy for Social Justice

Navigating the Course

Summer Melody Pennell

palgrave
macmillan

Queer Studies and Education

Series Editors
William F. Pinar
Department of Curriculum and Pedagogy
University of British Columbia
Vancouver, BC, Canada

Nelson M. Rodriguez
Department of Women's, Gender, and Sexuality Studies
The College of New Jersey
Ewing, NJ, USA

Reta Ugena Whitlock
Department of Educational Leadership
Kennesaw State University
Kennesaw, GA, USA

LGBTQ social, cultural, and political issues have become a defining feature of twenty-first century life, transforming on a global scale any number of institutions, including the institution of education. Situated within the context of these major transformations, this series is home to the most compelling, innovative, and timely scholarship emerging at the intersection of queer studies and education. Across a broad range of educational topics and locations, books in this series incorporate lesbian, gay, bisexual, transgender, and intersex categories, as well as scholarship in queer theory arising out of the postmodern turn in sexuality studies. The series is wide-ranging in terms of disciplinary/theoretical perspectives and methodological approaches, and will include and illuminate much needed intersectional scholarship. Always bold in outlook, the series also welcomes projects that challenge any number of normalizing tendencies within academic scholarship, from works that move beyond established frameworks of knowledge production within LGBTQ educational research to works that expand the range of what is institutionally defined within the field of education as relevant queer studies scholarship.

More information about this series at
http://www.palgrave.com/gp/series/14522

Summer Melody Pennell

Queering Critical Literacy and Numeracy for Social Justice

Navigating the Course

palgrave
macmillan

Summer Melody Pennell
Truman State University
Kirksville, MO, USA

Queer Studies and Education
ISBN 978-3-030-11583-8 ISBN 978-3-030-11584-5 (eBook)
https://doi.org/10.1007/978-3-030-11584-5

Library of Congress Control Number: 2019930398

Cover credit: © David Cobb/Alamy Stock Photo

This Palgrave Macmillan imprint is published by the registered company Springer Nature Switzerland AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

To the teachers and students of The Anchor School, for letting me into your classroom; to my dad, for teaching me to kayak; and to Susan, who supports me through everything.

Preface

If you have found this book while looking for an instructional manual on kayaking, please put it back down. This is not that kind of book. Here, kayaking is used solely as a metaphor for learning in a classroom setting. Though I have done my best to accurately describe the kayaking terms used here, I am by no means an expert, and my kayaking knowledge should be taken with a large grain of salt. But if you are interested in social justice education, queer pedagogy, critical literacy, and critical mathematics, this book may be of interest. This book also serves as an example of a post-critical ethnography and will be of use to pre-service and in-service teachers, as well as teacher educators and researchers, as an example of enacting multiple critical pedagogies in a middle school classroom.

When I started my doctoral program, I thought I knew exactly what I wanted to study. However, on meeting my new cohort these ideas began to shift and resulted in the study detailed in this book. Bryan Fede and I first began talking about our interests in our first semester, and we were surprised to realize that there were some interesting parallels between queer pedagogy and critical mathematics. Both fields valued questioning, critical thought and went hand in hand with social justice pedagogy. As we investigated the overlaps together, we had the idea to combine our interests and the seeds of our class at The Anchor School were sown. Over the next few years, we continued to develop our ideas, adding in another of my research interests as an English educator: critical literacy. This became *Math for a Cause*, an elective course for middle school

students, which we co-taught with Morgan, a classroom teacher, in the fall of 2014. The following chapters describe my post-ethnographic study of the course and analyze the impacts on student learning.

As previously stated, kayaking is used as a metaphor for student learning throughout this book; chapters are subtitled for aspects of kayaking, mostly for maneuvers a river kayaker completes along their journey. No knowledge of kayaking is required to follow along, as each chapter begins with a classroom anecdote followed by an explanation of the term. There is also a glossary with definitions of all terminology. It is my hope that this metaphor allows readers to see the dynamic actions that occur in a classroom, and that this terminology helps educators and students visualize their learning processes in a new way. This metaphor allows us to understand learning as movement, as students and teachers are always active participants in the classroom. I hope it queers your expectations.

Kirksville, USA Summer Melody Pennell

Acknowledgements

There are many people who helped me along the way and without whom this book wouldn't exist. First, I'd like to thank Morgan and the students in our class at The Anchor School for allowing Bryan and me to co-teach a social justice math class, especially one where we figured out the curriculum as we went. She trusted us with her students and her classroom and allowed us to employ a flexible teaching style that would frustrate many, and I will be forever grateful for her generosity and enthusiasm for social justice teaching. Similarly, a large thanks go to Bryan Fede, my co-researcher. When we met in our first seminar as doctoral students we thought our interests were opposite, and it was such a great experience to learn together how we could combine my interests in queer pedagogy and critical literacy with his in critical mathematics. I could never have imagined mathematics having a large part in my work, and my research is richer and broader now because of our collaboration. My advisor, George Noblit, was a great source of support throughout this process. Without his advice, humor, pep talks, and general encouragement I would have been lost. Because of George, I have gained an academic family and had many wonderful opportunities. I can only hope to be half the advisor and mentor he is. My other doctoral committee members were invaluable throughout my time at UNC. Cheryl Bolick's guidance led me to The Anchor School in the first place, and her mentorship and friendship helped me both in and out of her class. Jim Trier gave me experience working with pre-service English teachers and always

invited me to share my work with his students, which was encouraging to a new academic. Sandra Hughes-Hassell allowed me to co-teach my first class on social justice at the Master's level, which was a great opportunity to first put my ideas into practice. Silvia Bettez's course at UNC-G was my first in-depth investigation into social justice pedagogy and also introduced me to queer pedagogy, which has now become a large focus of my career. I am forever grateful for all of you.

I would also like to thank my community of scholar-friends. There are many friends who have helped me over the years as we have grown together. Ashley Boyd (whose book was very helpful in writing my own), Alison LaGarry, and Hillary Parkhouse, you three have been the dream team. Ashley, many extra thanks to you for reading a full draft of this book, and sometimes several drafts of some chapters. Your comments helped me finish with confidence. Mandy Bean, Tim Conder, Esmeralda Rodríguez, Katie Baker, Juan Ríos Vega, Cody Miller, Dani Parker-Moore, J. Montana Cain, Eldrin Deas, and Omar Simpson, your friendship and work have supported and challenged me in the best ways. Many of you have patiently listened to me as I have worked through this book-writing process. I am thankful to my Truman family for their support and embracing me as their colleague. I am especially grateful to Rebecca Dierking, Sara Day, and Sarah Mohler for our writing dates which allowed me to work on this book and get instant feedback when I needed it.

Last but not least, I want to thank my family for their continuous support. My partner Susan is my biggest supporter, and her librarian skills were much appreciated when making the index for this book. She feeds me and puts up with many random book comments, which came up no matter what we were discussing, and happily celebrates every writing and professional milestone. Everyone should be so lucky to have a partner like you. A big thanks also go to my dad, Dennis Pennell, who patiently read all of the kayaking descriptions and offered feedback and corrections. Whatever I got wrong about kayaking here is all my fault. My mom Diana is also a constant source of support, and I owe my critical eye to her and my dad's parenting, which included criticizing commercials and pointing out when things were presented in a way that skewed knowledge. Thanks to my sister Tegan, brother-in-law Noah, and Odin and Odessa for your love and sense of humor. To the Swogger family, thank you for welcoming me into your lives and giving me more nieces

and nephews to buy books for and compete for the spot of favorite auntie. To my chosen family, including Layla Aldousany, thank you for your friendship and love. And lastly, to Cat-Megan and Neville, thank you for the cuddles and inspiring me to take breaks with your modeling of relaxation.

Contents

List of Figures

List of Tables

CHAPTER 1

Learning in Motion: Kayaking Lessons

When I was a kid, I often went canoeing or kayaking with my dad. He taught my sister and I how to hold and maneuver the kayak paddle with the proper technique. A kayak paddle has blades on both ends, so that you can easily paddle on each side of the boat. To begin your stroke, you hold the paddle with both hands, with the arms at shoulder width. The driving arm, or the arm that moves down toward the water, is held straight at head height. This arm moves forward, as you use your torso to twist your body while reaching forward. The back arm now reaches higher than your front arm, and the paddle enters the water vertically, as close to the boat as possible, while still leaning forward as far as the kayaker can manage. While many beginners' first instinct is to use the force of their bottom arm (the one closest to the water) to move the paddle, it is the rotation of the torso that causes the motion. The lower arm does not do much work at all. The top arm keeps the paddle vertical. As the paddle moves through the water, it moves out from the boat in a diagonal, and when the bottom hand is at the hip, the kayaker flips the paddle out of the water, moving it up and continuing the diagonal motion. These paddling motions are then repeated on the other side. From the front, it looks like the paddle moves in constant diagonal arcs, almost creating a figure eight in the air (e.g., see Marketingreinforceme, 2010).

Unlike a canoe, which sits more on top of the water and allows the paddler to sit at bench-height with their feet on the floor of the boat, a kayak and the kayaker are both closer to the water. A kayaker sits on

S. M. Pennell, *Queering Critical Literacy and Numeracy for Social Justice*, Queer Studies and Education,
https://doi.org/10.1007/978-3-030-11584-5_1

a seat that is only slightly above the bottom of the kayak, with their legs pointed forward, slightly bent at the knee with their feet braced on footrests. This allows the kayaker, more directly than a canoeist, to guide the boat using their whole body. Leaning to the left, for example, moves most kayaks in that direction.[1] Because part of the kayakers' body is below the surface of the water, rather than above the surface as in a canoe, kayakers can generally lean (or edge, in kayaking terms) farther to the side than canoers can without tipping completely over.

The first few times I went kayaking I felt vulnerable, as I was not used to my boat and body feeling so connected to the water. I felt nervous paddling the kayak, as every movement I made influenced the boat, and so I feared falling over. As a stubborn preteen, I also did not always listen that well to my dad and found myself working against the boat and the paddle. Instead of letting my body guide the kayak and using the twisting of my torso to paddle it forward, I would grip the paddle harder and use the force of my arms in an attempt to direct the kayak where I wanted. I did not notice that as I paddled harder with my arms, my whole body moved more too, causing the boat to shift back and forth, which did not help it steer forward as I intended. When the wind was blowing against me, I would end up spinning in circles and felt frustrated. I am still not a skilled kayaker by any means, but I am more patient now and better at listening to my dad's lectures (or as he would say his "sage advice"). I have learned to work with the kayak and the water rather than against it (Fig. 1.1).

1.1 Kayaking as a Metaphor for Learning

These childhood experiences came to mind a few decades later when I was working with middle school students in a social justice class that combined critical literacy (Luke, 2012) and critical mathematics (Gutstein, 2003) under a framework of queer[2] pedagogy (Britzman, 1995). As I analyzed how my students were learning, memories of kayaking lessons kept surfacing. My dad has remained an avid kayaker, and he was surprised to hear that the lessons he gave me throughout my childhood transformed into a way to conceptualize learning. Kayaking as a metaphor allows us to look at the *action* of learning: How students move in, around, and through the curriculum using tools from their teachers as well as ones they discover on their own. As students and learning are not static, the idea of a kayaker moving

Fig. 1.1 My dad gives a kayaking lesson

along a river is a way to imagine students working through curricular material and concepts. Curriculum (or a class) in which students feel confident can be thought of as a calm river with few or smaller rapids that any kayaker can confidently paddle. More difficult curriculum can be conceptualized as a challenging river that causes a kayaker to strategize as they paddle through rapids and around obstacles in the water. In this metaphor, then, students are the kayaker moving through the curriculum. Their learning mindset is the kayak, as to move through a class (or down a river), students need a positive learning mindset (a kayak) to stay afloat. It helps them feel motivated and engaged. One could swim in a river and abandon your kayak, but the average swimmer will not be able to travel as far (or learn as much curriculum) without tiring themselves to the point of exhaustion. A kayak supports the paddler and allows them to rest when needed. Students can also get out of their kayak, or learning mindset, when they need a longer break.

A student who is struggling with curriculum will look similar to me during my first times kayaking as a preteen. In times of frustration when a student abandons their task, they get out of their kayak temporarily, abandoning their learning mindset. A teacher can help such a student get back in a learning mindset by reminding them how to paddle correctly, thus reminding them how to use their learning tools and materials. Wearing protective gear, such as a personal flotation device (PDF) or a helmet in rough waters can further protect the kayaker from danger. So, too, can our students feel protected when their teachers provide support in the form of practice, scaffolding, and other teaching and learning strategies. Hopefully, when they have regained their confidence, the student will become immersed in the river (the course) to engage in their learning. By leaning their body and moving their kayak, they can be ready to lean into the curriculum as they navigate through curricular concepts.

The kayak itself is also particular to the type of water: Kayaks are not built to be one size fits all, just as students need to shift their mindsets as they encounter different learning situations. When in still water with little current or rapids, kayakers prefer a boat that is long and tapers to a point at each end so that it can slice smoothly through the water with less effort. In a river with heavy rapids, often called whitewater for the color of the foaming water on the rapids' surface, they use a shorter boat that is easier to control in these conditions. You do not want your boat getting carried away with you into a dangerous spot before you have had time to plan your route. Students also need to plan their routes through a course and figure out if they can move through the curriculum relatively easily or if they will need to paddle with more concentration. When curriculum is easy for students, they can choose a flatwater kayak that will allow them to steadily continue through the concepts. For other courses, students may need to navigate larger obstacles and need a white-water kayak so they can better concentrate on the difficult learning tasks. As teachers, we must prepare our students so that they can learn in all kinds of situations (or types of water) and choose the right learning mindset (kayak) for the situation in tandem with the appropriate learning tools and strategies (kayaking gear).

The students described in this book all kayaked down the same river or a course called *Math for a Cause*. Their learning tools, or kayaking gear, included using critical literacy to read news articles and critical mathematics to create mathematical questions. Group work was also key

to their success, and the students supported each other as they worked through texts on difficult social justice topics, which also caused them to shift their mindsets as needed. They learned to look for textual elements such as who or what had the power as described in a news article (such as the police officer who killed Michael Brown in Ferguson, Missouri, or the system of policing itself) or what the author believed (e.g., that Brown was the embodiment of the harmful stereotype of a dangerous Black man or that he was an innocent teenager) and how these impacted the text's meaning. The teaching team, described in more detail in Chapter 2, also offered extra support for students in the form of scaffolding or modifying lessons for individual needs.

1.2 The Body, the Boat, and the Blade: Kayaking and Queer Pedagogy

As my dad described to me, the most important things in kayaking, in descending order, are the body, the boat, and the blade (meaning the wide end of the paddle). The movement of the body is the first thing that influences the motion of the boat. The body and the boat are in a reciprocal relationship during kayaking: The body needs the boat to kayak; the kayak needs the body in order to move with purpose in the water. So, too, are the student and their learning mindset in a reciprocal relationship in a classroom or other learning situation. A student can be in class without a learning mindset, but as all teachers know, mere presence does not result in learning gains. When a student is willing, motivated, and ready to learn, this mindset (the kayak) helps propel them forward in the course. The boundaries between the body and the boat or the student and a learning mindset can feel blurred, as in ideal situations they move as one. This blurring relates the kayaking metaphor used in this book not only to learning but also to queer pedagogy, in particular, as one of queer pedagogy's tenets—which are explained in more detail in Chapter 3—is to blur and question boundaries and limits (Britzman, 1995). Kayaking also works as a queer metaphor because it is a verb, and so a kayaker's focus is on the action. Queer pedagogy's roots are in queer theory which serves as a way to explore queer sexualities, but it also uses queer as a verb, meaning to question norms. To queer something is to explore its unexpected possibilities, and queer pedagogy seeks ways to create liberatory educational experiences.

These boundaries continue to ebb and flow as the body uses the blade to further maneuver the boat through the water. Working together, the body, the boat, and the blade are a trio that can move with, against, and/or through water. This interdependent trio has a collective agency, just as a student, their learning mindset, and their learning tools can work together. The tools and mindset can perhaps have their own agency, as tools have a material affect on the user and so create change. As Barad (2012) stated, humans are seen as the only beings or objects that can have agency, which is tied up in a binary of nature and culture. Humans assume that our morality, a large part of our cultures, gives us superiority over other beings (such as animals) and use this idea of cultural superiority to punish those who commit "crimes against nature," which historically has included queer sex acts. This wrongly assumes that everything in nature falls in line with human normative ideas and practices about heterosexuality. This feeling of superiority also causes humans to name what is and is not considered living; objects deemed as inanimate are assumed to have no agency.

While Barad (2012) queers the false binary of nature/culture by discussing atoms and amoebas, I posit it can also be queered by examining kayaking. Kayaking a river is a different experience in a short, white-water boat as opposed to a long, flatwater boat, just as the experience differs if you use a wooden paddle compared to a lighter weight one made of synthetic material. The material makes a difference, and in these moments the paddler and the paddle are temporarily fused in a moment of joint agency. This trio of the body, the boat, and the blade can be likened to a social amoeba, which "queers the nature of identity, calling into question the individual/group binary" (Barad, 2012, p. 26). Students used their bodies, boats, and blades in their learning journeys in the present study, and began to see how their mindsets (boats) were influenced by others, and how they could use their tools (blade) to investigate social justice issues.

Throughout this book, I will explore how queer pedagogy can be used to question binaries and norms, often ones that are unconscious, in teaching. Who has agency and authority in the classroom? How does that play into structures of power and oppression? How can students use their agency to explore topics of interest to them? Can the challenging of binaries, norms, and limits in classroom practices help students challenge binaries, norms, and limits in social aspects as well? As DePalma (2010) encourages us to do when using queer pedagogy, I will let these questions hang with you as you continue reading.

1.3 The River Map: Book Organization

In this book, chapters are subtitled in line with the kayaking metaphor. School, Community, and Students: The River, the second chapter, describes the course and school setting in detail. I explain how I worked with my co-researcher (Bryan Fede) and co-teacher (Morgan, a pseudonym, as are all other names) and share descriptions of the students' personalities and working styles. Chapter 3 outlines the scholarship in queer pedagogy in more detail than above, as well as covering the scholarship in social justice pedagogy, critical literacy, and critical mathematics that I consulted to plan the course. This chapter also contains a discussion of my research methods. Chapters 4 through 7 analyze examples of student learning and detail how teachers and researchers can conceptualize this learning using the extended kayaking metaphor. These chapters could be read in any order; they build on each other but each kayaking metaphor is distinct. Chapter 4 relates how students move in and out of their comfort zones to explore topics through critical lenses. The more students stay out of their comfort zones, the greater their learning. The following chapter, Moments of Active Reflection: Eddies, discusses the reflection necessary in critical pedagogical spaces as a rest from emotional topics and as time to plan future work. Chapter 6 shares examples when students (or teachers) needed to get out of the river (the course) temporarily to go around a barrier. In Moving Forward When Faced with Learning Difficulties: Rolling a Kayak, times of students struggling with their learning so much that they tipped their kayak over but were able to flip upright and keep moving down the river (rolling) are described along with teaching strategies to aid this process. Lastly, Chapter 8 synthesizes the learning outcomes from my students and suggests implications for teaching and research more broadly.

1.4 Fellow Travelers

It is my hope that current and future teachers, teacher educators, education researchers, and queer theory and pedagogy scholars will find this book useful. All readers may view this book as an example of theory to practice. Research studies of queer pedagogy in K-12 classrooms are increasing, but still rare, and many studies on social justice education focus on teachers without as much insight into student thinking. Here, detailed accounts of student conversations are analyzed, showing how

the students worked through difficult social justice topics while utilizing critical literacy and critical mathematics skills. Teachers may see this book, not as a prescriptive guide, but as an offering of ideas for thinking of the learning in their classrooms as dynamic. By envisioning students as agents, through a kayaking metaphor, teachers may be better able to articulate the learning they are already witnessing and fostering through their curriculum and teaching practices. Along with the lens for viewing student learning, there are many practical curricular examples that can be adapted to current social justice topics for literacy and mathematics lessons. Teacher educators may wish to share these examples with their pre-service teachers, as well as use the kayaking metaphor to spark discussions on how we conceptualize student learning, and with what consequences. As language effects how we exist in the world, so does our language about students and classrooms effect how we work as educators. Education researchers, as well as teacher educators interested in teaching qualitative methods, can use this book as an example of ethnographic work in action as I share our co-teaching process and how it affected my research methods as the course progressed. All education research requires flexibility, adaptability, reflection, and compromise, and these elements are found in this volume. Lastly, I hope that fellow scholars interested in queer theory and pedagogy find this study to be a compelling addition to the field. The phrase "queer pedagogy" is still relatively unknown by many education professionals, and by publishing this work, I strive to bring these ideas into the light so that other educators and researchers will see that a queer pedagogical lens adds critical depth to our work with teachers, students, and classrooms.

Notes

1. An exception is touring kayaks, which are longer, and usually turn away from the side they are leaned toward. This book will not get into the nuances of kayaking, kayaks, or gear, and will take some liberties with terminology to create a metaphor for learning. A glossary of kayaking terms is provided at the end of this book.
2. Queer is used in a variety of ways in this book. Queer pedagogy refers to a way of approaching teaching in which norms and boundaries are constantly questioned and stretched. Queering refers to this idea of questioning as well. Queer in reference to people indicates anyone who is not heterosexual and/or cisgender (which means that the sex you were

assigned at birth, male or female, matches your gender identity, man or woman). LGBTQ+ will be used interchangeably with queer and stands for lesbian, gay, bisexual, transgender, and queer, with the plus symbol indicating anyone else who is not heterosexual or cisgender.

References

Barad, K. (2012). Nature's queer performativity. *Women, Gender & Research, 12*(1–2), 25–53.

Britzman, D. (1995). Is there a queer pedagogy? Or stop reading straight. *Educational Theory, 45*(2), 151–165.

DePalma, R. (2010). The no outsiders project: In search of queer primary pedagogies. *Transformations: The Journal of Inclusive Scholarship & Pedagogy, 21*(2), 47–58.

Gutstein, E. (2003). Teaching and learning mathematics for social justice in an urban, Latino school. *Journal for Research in Mathematics Education, 34*(1), 37–73.

Luke, A. (2012). Critical literacy: Foundational notes. *Theory into Practice, 51*(1), 4–11.

Marketingreinforceme. (2010, May 3). *How to paddle a bit like Tim Brabants.*

CHAPTER 2

School, Community, and Students: The River

When I first visited The Anchor School in the spring a few years before this study began, I was struck by its open environment. This openness was physical and mental. The buildings for the elementary, middle, and high schools, as well as central buildings for the offices and activity spaces, are in a quiet wooded area. Unlike at some public schools, there is no School Resource Officer patrolling the grounds or halls, and visitors can walk freely into the buildings without having their driver's license scanned or following strict check-in and check-out procedures. The middle and high school operate with standard class periods as in typical public schools, but there is substantially more freedom of movement. At the high school, I saw older students walking around campus in small groups, students studying outside on their own, and viewed the meeting space with its large open room, where students and teachers set up folding chairs when they held a community meeting. At the middle school, I saw students running in and out at lunchtime with bare feet, taking their lunch boxes to their preferred outdoor or indoor spaces. I would later learn that one of the privileges students earned when they moved from elementary to middle school was the freedom to abandon their shoes, and the new fifth graders gleefully abandoned theirs in cubbies each student had in their homeroom. There is a creek behind the middle and elementary schools, and students eagerly searched for crawfish and played in the water. As someone who has only experienced public schools as a

S. M. Pennell, *Queering Critical Literacy and Numeracy for Social Justice*, Queer Studies and Education,
https://doi.org/10.1007/978-3-030-11584-5_2

teacher and student, this level of freedom and interaction with nature was simultaneously thrilling and alarming.

The teacher in me instantly worried about the kids playing by the creek and wondered who was keeping track of everyone. But The Anchor School kids and teachers were not worried. Their school seemed to run on organized chaos where during free time everyone knew the expectations and was given the freedom to explore their own boundaries. At the end of the day, each student has a job to help take care of the school environment. Students might clean the windows, empty the classroom trashcans into the larger bins, or any other number of small jobs to keep the building and surroundings tidy. Resources were used sparingly and reused when possible. Everyone was taught to work together and to value each other and their space.

Through these lessons, they learned important concepts such as responsibility and caring. As we worked with our students in our social justice literacy and mathematics elective *Math for a Cause*, my co-researcher Bryan and I often commented on how well the students got along. Unlike in other middle schools, there were not easily discernible cliques where you could observe what the students were wearing and tell who were friends with whom. Personal style was more relaxed and while I am sure there was some kind of social order we were not aware of, it was different from your typical middle school scene of popular kids, jocks, and nerds.

Thus, the atmosphere of The Anchor School was not your average environment and so undoubtedly affected our study. In our metaphor of a kayaking journey, The Anchor School and its surrounding cultural context can be thought of as the riverbanks. A river—in this case, our course—is altered by the environment it is in; so too are the riverbanks affected by the river itself. The kayakers (our students and teaching team) can also affect the river and riverbanks with their actions. The next sections will give context for the riverbanks, the river, and the kayakers in this study.

2.1 The Riverbanks

The Anchor School is a private K-12 Quaker school in a southern state. It is in a semi-rural area that serves as a buffer between two urban areas and is surrounded by woods with small farms nearby. The largest of the nearby cities had an approximate population of 250,000 in 2014 (the

year the study was conducted), with racial demographics of nearly equal White and Black populations (around 40% each) with approximately 13% Hispanic and 4% Asian (according to the city's Web site, not included here for anonymity). The other urban area was smaller, with around 40,000 people, the majority (around 70%) of whom were White with Black people making up around 10% of the population. There are several smaller towns close by as well, and the student population was spread out within this larger area.

The surrounding urban areas were known as liberal spaces within a more conservative state, and the students in our class seemed to be from socially liberal homes, based on their comments on politics and which news sources they watched with their parents. The nearby urban areas house two large research universities which served as employers for many students' parents, and in general, the parents seemed to be in professional careers. Despite the liberal leanings of the area, or perhaps because this liberalness was a neoliberal one which thrives under a false guise of "being reasonable and promoting universally desirable forms of economic expansion" (Duggan, 2002, p. 177) which translates to supporting White interests, racial tensions within grew between the urban areas. Gentrification was a growing problem in the larger city's downtown areas. Visible LGBTQ+ communities included many social groups for niche populations (such as a Latinx queer people or polyamorous families) and an annual city pride celebration is held at one of the universities. However, some infighting occurred within these queer groups as queer leaders of Color pushed back against White conceptions and norms, such as having a police presence at the annual pride festival, and at the time of writing pride is led by a Black woman who heads a city LGBTQ center.

Atypically for a southern area, which tends to have a social conservatism influenced by various forms of Evangelical Christianity, the students at The Anchor School were comfortable discussing queer issues. Notably, they were more comfortable with queer issues than racial ones. This is likely because of The Anchor School's population. At the middle school where the research took place, all the faculty and staff were White; only a few students of color attended at the time. In contrast, some teachers, staff, and students were openly queer, and many students had queer parents or other family members. The middle school Gay-Straight Alliance (GSA) was the most popular club when we conducted our study, and many members identified as straight allies. The GSA staff advisor told me that to announce the first meeting of the year, the students excitedly

planned a skit where they played the popular Katy Perry (2008) song "I Kissed a Girl" (whose subsequent lyrics proclaim "and I liked it") to the school's delight. The club also marched in the annual pride parade and had begun reaching out to other local schools when they needed help with queer issues, such as supporting another local (public) middle school's GSA when the principal threatened to ban the club. They also were celebratory of the movement toward marriage equality. Middle school GSAs are rare, especially in the relatively conservative South, and its large presence here was admirable.

Despite the positivity of queer celebration, the school's conceptions leaned toward homonormativity (Duggan, 2002), a concept indicating a drive for equality that mirrors heterosexual norms and mainstream inclusion for queer people. Homonormativity works within a neoliberal mindset that limits public views of queerness to how it can fit within a consumer market. Focusing queer issues on marriage equality puts queer people within a frame that is palatable to conservative heterosexuals and removes attention from other aspects of queer existence such as relationships outside of marriage and/or monogamy, youth activism, and issues of housing inequality. This focus on marriage equality by The Anchor School was understandable, however, as it dominated local and national news at the time of the study. When marriage equality came to our state midway through the term due to a circuit court decision, the school community celebrated this victory as it positively affected people in the students' lives.

This is not a celebration that needs to be hampered for fear of being normative, as all victories are important, and it is worth celebrating the work of activists, but it does emphasize marriage rights as a key factor in queer lives. There are some queer activists against the concept of marriage being tied to government and human rights at all (e.g., Conrad & Nair, 2010). Additionally, the use of the Katy Perry (2008) song highlights the problematic nature of straight artists capitalizing on queer experiences ("I kissed a girl") while simultaneously maintaining their heterosexuality ("hope my boyfriend don't mind it"). When this song was released, there were debates in queer circles about the heteronormativity of a song that relied on a sapphic moment for titillation rather than representation. While I do not expect middle schoolers to pick up on these nuances, I wonder if any of their teachers did. This GSA's activism was tied primarily to marriage rights and the rights of other students to have a GSA, which again is admirable. I do not want to put

the burden of queering LGBTQ+ activism on preteens and early adolescents. However, I do wonder if there were any critical conversations on LGBTQ+ issues that included intersectionality and discussions of other issues within local queer communities. Unfortunately, this was beyond the scope of my own study, and I was unable to attend any GSA meetings.

Students Perceptions: Individual Focus to Social Justice

While queer issues were discussed openly and often at school, some of our students questioned *how* they were discussed during individual interviews. Ally (who will be profiled in the kayakers section) was a concrete thinker, and when Bryan and I interviewed her she expressed her impression that the staff wanted all the students to think a certain way. She explained that the staff talk about change within people, so that any talk dealing with a social justice topic like LGBTQ+ people is discussed on an individual, rather than a group or systemic, basis. For example, she said they were told "if somebody was not gay when they were younger but then in high school they change, then you shouldn't be mad at them or anything." While I was not present for these school conversations, so I cannot state that this is exactly what school staff said, Ally's impression is interesting. The school teaching students that people's sexual orientations may change is great, as sexual fluidity is real and common, and it is important that children learn that they (and others) are free to explore their identities rather than coming out once and being stuck with the first identity they name. However, it seems that, for Ally at least, there was little understanding of how an individual's identity related to a broader social context of heteronormativity or of systemic homophobia.

Similar ideas came out in Sum Dood's interview. When asked in his final interview if his ideas on social justice had changed, he said, "I think partly it [the class] made me more trying to understand why the people who don't like gay marriage don't like it, [instead of] just going with gay marriage cause that's what we're doing." Here, Sum Dood is realizing that at their school, mostly everyone believes that gay people should be allowed to get married. He recognizes that one of the tactics to convince people to support same-sex marriage is "cause that's what we're doing," meaning a reliance on the idea of social momentum toward a more liberal society without engaging in any critical reflection on the topic. He mentioned, like Ally, that the school believes in gay

marriage and he agreed it was important, but he had not really thought about why it was important to him, beyond a general belief in equality for all. Consequently, he had not thought about why others were against it. From thinking through these issues in our class, he began to "look at the other side to understand why," so that he could better counter homophobic ideas and articulate his own arguments in support of marriage equality. This exploration is important in any social justice work, as activists and allies are stronger if they can articulate specific reasons for their beliefs beyond "it is the right thing to do."

Quaker Values and The Anchor School

This examination of school norms and beliefs necessitates a look to the Quaker foundation of The Anchor School. While investigating them in depth was beyond the scope of this study, it is still important to consider how they affect the school community's value system. One of the reasons I chose this school as the study site was because I thought equity and social justice were values embraced by the school community and included in curriculum. Some examples that led me to this belief were: the annual event in honor of Dr. Martin Luther King Jr.; bringing in guest speakers who are humanitarians and dedicated to diversity; students and staff participating in diversity events in the region; and inclusion of community service in the middle and high school curriculum. This belief also came from their mission statement. While social justice was not mentioned explicitly, ideas of respecting others, service, and teaching students "that it is possible to change the world" (citation omitted to maintain anonymity) indicate a desire to help others and work toward equality. The mission statement also names these values as explicitly Quaker and includes other Quaker values that are discussed below in more detail. While the Quakers are a religious group (who call other Quakers "Friends"), the school was not otherwise religious. There were no group prayers or other religious observances, and students of all faiths were welcome at the school.

Silence and reflection were highly valued at The Anchor School, and students began and ended each day by "settling in" and "settling out," in which they sit in silence for about ten minutes. Having participated in this, I can attest that it is calming and helps you center yourself, making it a nice transition for students and teachers. Though it may appear a form of meditation to outsiders, Quaker scholars point out that this is

not exactly the case: "The silence is used for mediation, in the sense of concentrated thinking … though they do not use any particular meditational technique" (Bradney & Cownie, 2000, p. 59). Further, silence does not imply passivity, but is "a creative, active experience…it involves concentration, commitment and self-discipline on the part not only of the individual, but the worshipping group as a whole" (Bradney & Cownie, 2000, p. 60). At The Anchor School settling in and out was not a form of worship, but sometimes a teacher would ask the students to concentrate on something like a positive experience they had that day and carry that feeling with them when they left school. Ally, our previously mentioned student, told me that science shows that silence is helpful for the brain, and she appreciated the school's space for silent reflection.

As a participant observer, I was amazed to see the entire middle school—students and teachers—sit in this silence at the end of the school day. The first few times I looked around curiously, sure that I would spot a few students fidgeting or whispering, but remarkably all were both quiet and still, with phones put away. As soon as it was over there was a mad dash for bags and a rush out the door, but for ten minutes everyone was united in silent contemplation. Parents of children who attend The Anchor School told me that even the very young children are capable of this stillness. This practice continues to amaze me, and I wonder how it would have affected my own former high school students. I also find that this moment of rest and reflection is helpful to those doing social justice work. This work can be relentless and exhausting, and though many activists call for "self-care" it seems just as common for activists to burn out as they do not take moments for themselves.

Social Justice Contradictions Within Quakerism

Despite the school's commitments to diversity and service, there are some beliefs that seem out of sync with social justice work, especially when viewed through a queer lens of questioning norms and boundaries. One of the Quaker values mentioned in the mission statement is seeking the truth, which can be seen as counter to queer values that believe in openness more than truth, or even multiple truths. The mission statement later discusses truth again, stating that they hold the "belief that truth is continually revealed." This tenet also includes the acknowledgment that "answers are dynamic, not static" which is a queer conception

of problem-solving and indicates that answers may shift. However, it still implies that there is truth in the first place. It further implies that there is a *single* truth; the mission does not say anything about the possibility for simultaneous multiple truths, or that truth may look different to different people. The concept of multiple truths is vital for social justice work, which must consider the perspectives of diverse groups of people with different needs and priorities. Whose truth is privileged? Whose truth is "revealed," and how possible is it to reevaluate that truth and acknowledge that "answers are dynamic?" While I did not ask any teachers about their interpretations of the mission, I wondered in retrospect if it had an influence on their teaching or curriculum design.

This seeking of truth aligns with Heath's (1996), a Quaker educator, explanation of truth in Quaker schools. Heath stated that "the 'peculiar mission' of a Friends school is to empower its members…to live more fully in Truth. For Friends, to 'empower' is to enable a person to be his or her own minister in seeking that Truth" (p. 5). The Anchor School statement goes on to say they have a "commitment to look beyond and beneath the obvious, searching for truth and identifying falsehood." This juxtaposition seems contradictory when considered from a queer standpoint. How can one search beneath the obvious if you are still engaged only in searching for truth or falsehood and not engaged in the nuances that exist between these two poles? Again, I cannot say how much (if at all) these tenets on truth effected teaching at The Anchor School: I did not ask the teachers to examine the mission and reflect on how it effects their personal teaching strategies or the school's overall learning environment. However, I think it is possible that this belief in truth may have affected the ways our students worked in class and pursued their research.

The school's value of service, which I initially saw as an indication of a commitment to social justice, was more complicated and was not necessarily approached with a liberatory stance toward empowering others in the community. Examining Quaker values on service helps to illuminate these contradictions. Quakers have a long tradition of service and activism, which often draws outsiders to the religion. Bryan, my co-researcher, and I found that when students discussed their service work it seemed more about the students helping someone for a day rather than a sustained project with a community. Part of this divide between service and justice work may stem from Quakers' tendency to avoid conflict (Bradney & Cownie, 2000). In Quaker Meetings (religious observances

are called meetings rather than sermons or services), decision making can take months as full agreement is required before finalizing a decision. As Bradney and Cownie (2000) pointed out, "Quaker decision-making is also Quaker dispute avoidance since one cannot dispute a decision which one has freely and fully consented to or which one accepts was made according to the promptings of the spirit" (p. 152). This implies that once a decision is made, discussion is complete, and no further arguments can be brought up. Social justice is contentious, and it is nearly impossible to get a large group to come to consensus on intersectional issues regarding race, gender, class, and others, especially if those decisions have to be made before one can take action. Working on issues such as homelessness, for example, requires both short-term decisions such as where to procure and how to distribute food and clothing and long-term decisions such as how to create more equitable housing in a community. Waiting for consensus on some of these issues would cause harm to the people experiencing homelessness who are in need of immediate assistance.

Other than the need for consensus, Quaker beliefs on nonviolence may also affect how Quaker institutions complete service work. As Bacon (1986) pointed out in her discussion on feminism and Quaker beliefs, "The Quaker devotion to nonviolence has sometimes made it difficult for Quakers to know how to handle anger" (p. 225). Anger, and working through it, is often a part of social justice work. If The Anchor School leaders, or at least those who planned community service activities, were uncomfortable with anger from a Quaker mindset, then it makes sense that service was relegated to community cleanups rather than participating in the more emotional work required by social action. One teacher at the school discussed her dissatisfaction with the way service learning was conducted with me. She saw their current method as taking their privileged students to another community for a day of service, such as at a food bank, and returning home without discussing the larger issues at play and how they and the larger community were affected. This is also counter to what most see as the intent of service learning: It should be fully integrated into the curriculum, offer time for deep reflection, and respond to community needs (Furco, 1996). At the time of the study, a small group of teachers were working to change the way the school conceived of service learning and wanted to bring a social justice lens to the conversation. They were also planning to integrate it into the curriculum and allow more student choice, so that the students could explore service opportunities for issues they were passionate about.

2.2 The River

Now that we have examined the broader community and school setting (the riverbanks), it is time to explore our course (the river), *Math for a Cause*. Environmental factors on the riverbanks affect the river's conditions, which in turn affect the kayakers. The class was offered as an elective for fifth- through seventh-grade students (the eighth graders had a required course during the time we met). We met on Tuesdays and Thursdays during the last period of the day. This time slot gave us some problems with attention span as well as students leaving early to compete in sporting events, as is common in most school settings. The class was held during the first 10-week trimester of the 2014–2015 school year. Morgan, Bryan, and I served as co-instructors, though Morgan was the primary teacher and in charge of all assessment. Morgan was a math teacher at The Anchor School, and agreed to work with Bryan and me as she is interested in, and was already practicing, social justice teaching. Bryan and I were in graduate school together and found that our shared interest in social justice pedagogy could be combined in interesting ways that utilized our disciplinary interests (English for me, mathematics for Bryan) as well as incorporating my additional interest in queer pedagogy. Like the rest of the middle school staff at The Anchor School, we are all White. This may have helped our mostly White students (full demographics shared in a later section) be more comfortable talking about race with us. While Bryan and I could write comments on student work, as researchers it was unethical for us to formally assess their work. I typically led discussions and lessons that were focused on literacy, while Morgan or Bryan led discussions and lessons on mathematics. We all participated in facilitating discussions on social justice topics.

We covered three instructional units that focused on current social justice events and were often guided by student interests. The units were: (1) Ferguson and the killing of Michael Brown, (2) student-group choice between: marriage equality, environmental issues, education, or health care, and (3) marriage equality. See Table 2.1 for more details on our curriculum structure. Brown died before the semester began and this was heavily reported in the news as the Black Lives Matter movement grew in prominence as a response to police violence against People of Color and Black people in particular. For the second unit, we asked students to rank four possible topics (chosen partially from a focus group Bryan and I conducted in the spring with students, and partially from

Table 2.1 Curriculum structure

	Social justice topic	*Articles read and/or information consulted*	*Mathematical questions (written by students)*	*Data collected*
Unit 1	Michael Brown	"Anonymous Operation Ferguson" – Press Release. https://pastebin.com/KpmJKU8D	How many police shootings have occurred in Missouri, as compared to other states, in the last five years?	Audio recordings of student group work, reading handouts, math handouts, field notes, and audio from final whole-class discussion
		"Ferguson Shooting: Hip-Hop Moves as a Strong Force for Michael Brown." Associated Press	How many people listened to the Michael Brown tribute song, as compared to other songs by the artists?	
		"Grief and Protests Follow Shooting of a Teenager." Julia Bosman and Emma Fitzsimmons	How many people think Michael Brown is guilty?	
		"Eric the arsonist: Holder fans the Ferguson Flames." Linda Chavez	What is the average height and weight of men in our community compared to Michael Brown? [their article emphasized his size]	
Unit 2 (student groups picked topics)	Marriage equality	1. "Why Christians Won't Back Down on Gay Marriage." Pascal-Emmanuel Gobry 2. "10 Reasons why Homosexual Marriage is Harmful and Must be Opposed." www.tfpstudentaction.org	Exact question not recorded, but were researching how many Christian churches were welcoming of LGBTQ+ people	Audio recordings of student group work, reading handouts, math handouts, field notes, and audio from final whole-class discussion
	Environmental issues	Title not recorded: Students found an article about the use of turtles in Santeria practices	Do people think it's OK to sacrifice turtles for religious practice?	
	Education	"How the Education Spendthrifts Get Away with It" Paul Peterson	Are lower income schools better than higher income schools?	
	Health care	National Healthcare Disparities Report, 2011, Chapter 10: Priority Populations	Exact question not recorded, but were researching how transgender people of different races are treated in the healthcare system	
Unit 3	Marriage equality: All students first read an article from the local paper on same-sex marriage	Polling data on same-sex marriage	How much has the percentage of people in support of same-sex marriage increased each year?	Audio recordings of student group work, reading handouts, math handouts, field notes, and audio from final whole-class discussion, student videos, student Web site
		Number of states in 2014 where same-sex marriage was legal	How many states already support same-sex marriage, and how can that convince people in other states to vote in support of it?	
		Statistics on bullying for LGBTQ+ youth	Did not have a cohesive question, but their intended message was to convince conservative teens that being "gay is OK" and to prevent bullying	
		Suicide rates per state as compared to marriage equality laws by state	Is there a correlation between marriage equality laws and suicide rates?	

Morgan's knowledge of individual student interests) and then we placed them into groups accordingly. As mentioned previously, same-sex marriage became legal in our state during the trimester and the students were already talking about it at school, so focusing on it for the last project was a natural fit. This also allowed us to end the semester on a positive note, to give our students a hopeful mindset of how social action can result in positive change. More detailed examples of these units are shared in later chapters.

Each of the first two units followed a similar instructional pattern. First, the students read news articles about the topic. Sometimes the teaching team chose the articles and sometimes the students did; if this was the case, they sought teacher approval (in which we checked that the reading level was appropriate and that the article was from a legitimate source). As they read, they completed scaffolded handouts that focused on critical literacy by asking them to answer questions such as "Who has the power?" See Fig. 2.1 for an example of a critical literacy handout. After this, they would brainstorm and create a mathematical question inspired from the article and conduct more research as needed (see Fig. 2.2 for an example of a critical mathematics handout). For example, in the second unit one group wanted to find out if there is a correlation between student achievement and school funding. Often, the math portion was difficult as the students had to sift through data and try to "read" the numbers. As such, students did not usually finish their math problems, but they learned a lot from problem-creation and solving. The school funding group, for example, learned that school funding was not the same by state or even city. As private school students, this was not something they had ever needed to consider and gave them new insight into educational issues on a national scale. For the last unit, students created a presentation (either a video or Web site) using math about marriage equality. Throughout the course, students worked in groups of three to five on both reading articles and creating math problems. Occasionally, we would conduct whole-class math lessons as we saw the need. Whole-class discussions happened during and after each unit giving students time to reflect and dialogue on the topics and share their small group work. These processes will be discussed in more detail in later chapters.

Our classroom environment was freer than in a typical school, or at least the types of schools where Bryan and I had worked as classroom teachers. The middle school had been recently remodeled to include

several small study rooms, of which we took full advantage. While whole-class discussions took place in Morgan's classroom, when students worked in small groups they found their own private spaces in these study rooms, or sometimes a classroom that was not in use during our class period. This physical freedom allowed the students to work without

Article title _____

Directions: 1) decide together on your topic 2) decide who will complete each role 3) search for an article online- try to find one that has comments so later you can put your calculations in the comments. You don't have to agree with the article, it just needs to be on your topic. 4) read the article carefully (including comments if you want- though be warned that some people can be mean in the comment section!) and answer these questions. If there are answers you don't agree on, you can write down all answers and specify who thinks what.

Roles:

Recorder: While you should talk about your answers to the questions as a group, the recorder writes down your responses. If there are questions you don't agree on, you can write down all answers and specify who thinks what.

Discussion director: You keep the discussion on track- these topics are complex and your discussion may take many directions, which is OK. But you must get everyone back on point if it strays too far. If your group has a second computer, help the researcher.

Online researcher: You are in charge of leading the search for an article on your topic choice and for other research, though others in your group may also use a computer. Be strategic and use search terms ("LGBT marriage" or "poverty and healthcare") instead of full questions ("Do poor people get different healthcare from rich people?")

_____

1. What is your social justice topic?

2. What website is your article on? Here you can write the main address only, like www.cnn.com, but remember to write the title of the article at the top of the page.

Fig. 2.1 Critical literacy handout

1. What/who does the author write as having the **POWER**? How do you know?	2. What are the **BELIEFS** of the author? How do you know?	3. Based on the power and beliefs, who do you think is the intended **AUDIENCE**?	4. In this article, what do the author or people interviewed see as **NORMAL**? How do you know?
5. What **math words** do you notice (value, weight) and how does that effect the meaning?	6. Are the **opinions** in the article different from your own? How?	7. What is **your reaction** to the article? (How do you feel reading it?)	8. What do you want readers of this article to know about the topic? (may want to check the comments)

Fig. 2.1 (continued)

Math for a Cause: Choose your own adventure

Goal: Create and work on a math problem based on your social justice issue and article. Think of the article as a starting point- you may need to think bigger to create and solve your math problem

Remember your topic is not about social justice unless you are investigating how it impacts groups of people who have been/are discriminated against. Dig deep!

Directions: 1) Read the roles below, and with your group decide who will do what. 2) Discuss and answer the 9 questions. 3) Use the article and your worksheet to come up with your math problem. Everyone should work together on your problem while completing your roles. 4) This will be challenging- ask for help if you get stuck! 5) If you're unsure if a source is legit, ask us.

Roles:
Recorder: You're responsible for writing the answers to these questions If your group members disagree, write down the different ideas and who had them.
Researcher: Using your article or outside sources, find information you need for your problem. Ask one of us if you need help with finding sources, or are not sure what you need.
Problem constructor: With your group's input, lead the brainstorming session to create the math problem you will solve. You'll need notebook paper. Social justice math is complicated: it won't be a simple equation.

Research tips:

1) Use **key words** to search instead of full sentences. Use the library website to find information for your math problem.
2) Be careful with your key words. For example, if you want to find out numbers of people who are racist, remember that they probably won't call themselves that. For example: instead of "racist people who think Michael Brown was guilty" try "survey Michael Brown opinion" and then look at the way people answered different questions. *You* have to **interpret the information** to figure out what it means- google can't always do it for you.
3) **Skim** the headings of an article to see if it has information you're looking for. Don't read everything carefully before deciding if it's useful.
4) Don't get distracted by a research black hole! When you find information, before you write anything down **make sure that the information answers your research question.** If it doesn't keep looking.

Fig. 2.2 Critical mathematics handout

1. What do you want your math problem to focus on? Give a specific example from your article. Just writing "education" or "marriage equality" is too big- find something specific and related to social justice.

2. What information do you need for your math problem? Statistics, opinion polls, etc.?

3. What **social justice** question(s) is your math problem going to answer? (Examples**:** Are poor people targeted more than wealthy people in environmental regulations? Are areas with mostly white populations given more funding for schools than areas populated mostly by people of color?)

4. Write your math problem here. **Show one of us before you start working**. Use notebook paper to show your calculations.

5. Write down websites you consult for your math problem. Don't write down everything you look at, just the ones you end up using (use notebook paper if you need more space):

6. When you've finished your math problem (or as far as you can go) write down what you found:

7. Do you have a different view of your topic now? Why or why not?

8. How can you use your math findings to teach others about your social justice topic?

9. What are the limits of using math to teach others about your topic?

Fig. 2.2 (continued)

much interruption and to have privacy, which may have allowed them to feel freer while engaging in discussions on difficult topics such as racism and homophobia. The teaching team would walk around between these groups offering help when needed. This allowed the students to focus more easily, but sometimes when they spoke with all three of us, especially when the teachers did not consult with each other in between checking on groups, we would each give them different ideas which lead to confusion. This open environment, however, seemed fruitful as when listening to their recorded conversations it was evident to me that students were engaging in critical dialogue about their social justice topics. These conversations were likely more open without a teacher present, even though they were aware of the recorder and sometimes addressed it, or me, directly. The small-group environment also allowed each student to talk more than is possible in a large group discussion.

2.3 The Kayakers

When our class began, Bryan and I were excited to meet our fellow kayakers. Class enrollment was capped at 15 students as The Anchor School values small class sizes. Twelve students enrolled, and 10 out of the 12 participated in the research study. Since this was an elective course, the class population was self-selected by students who were interested in math and/or social justice (this phrase was used in the course description given to students before they picked their electives) and/or enjoyed taking classes with Morgan. There was a possibility that some students may have been pressured into taking this class by their parents, but as there were approximately 35 electives offered each trimester of which students are required to take three, we felt it was highly unlikely that there would be many students in the class who did not wish to be there.

To protect the privacy of the students, I am using student-chosen pseudonyms here. Morgan is also a pseudonym. Table 2.2 lists the demographics of our student participants, and I also describe their personalities here to give the reader a better sense of our classroom dynamic. Our focal students (who were interviewed in the beginning and end of the course) were Jimmy Smith, Ally, Mia, and Sum Dood. Bryan and I chose them from a smaller subset of the total participants who returned their parental permission forms promptly, and these four in particular fit our criteria of representing a range of experiences, grade levels, and interests. The focal students' interests and values all effected

Table 2.2 Participant demographics

Name	*Age*	*Grade*	*Legal sex (male or female)*	*Gender identity (boy or girl[a])*	*Race*
Aiden	11	5	M	B	White
Ally	11	6	F	G	White
Ashley	11	6	F	G	White
Izzie	12	7	F	G	White
Jimmy Smith	10	5	M	B	Mixed race
Justin Case	12	7	M	B	White
Mia	13	7	F	G	White
Rosette	11	6	F	G	White
Sue Denim	12	7	M	B	White
Sum Dood	11	6	M	B	Mixed race

[a]Students were given the opportunity to circle boy, girl, transgender, or write in their own gender identity

how they paddled their own kayak through the course and engaged with the issues they explored.

Jimmy Smith was one of our younger students as he was in fifth grade and did not have as much experience with middle school math or service learning. He chose the class mostly because he was interested in, and skilled at, math. He often asked critical questions when working with his groups of both their mathematical calculations as well as the social justice issues at hand. Jimmy's engagement often served as encouragement for his group members.

Ally, a sixth grader, was our concrete thinker: She stated she liked math because there were rules and would get distressed when there was not an obvious singular answer to a problem. Morgan shared with us that this need for structure sometimes caused her problems socially. She was also a gifted athlete, where her desire for discipline served her well. By the end of the course, Ally's fixed mindset was beginning to shift as she learned that numbers did not necessarily represent an immobile truth.

Sum Dood, also a sixth grader, was one of our liveliest students. His pseudonym took many spellings over the trimester (Some Dude, then Sum Dude when he realized he could make a math pun, before finally settling on Sum Dood), indicating his playful approach to the course and his participation in the research. He enjoyed math and was also passionate about social justice causes, particularly LGBTQ+ rights. He was

an active member of the GSA and marched with them in the local pride parade. In whole-class discussions, he was often eager to share his ideas.

Mia was very different from Ally and Jimmy Smith. She was a student who entered the class not liking math, but she took the course because she enjoyed service learning projects and hoped to complete one in the class. Mia had even participated in a school field trip where they visited important sites from the Civil Rights Movement and spoke of that trip as influential in her commitment to service. She was usually reading a novel before class began rather than chatting with her classmates which made me think she might be quiet in groups, but on the audio recordings she was vocal with her group and freely expressed her opinions. As a seventh grader she was one of our older students.

Our other students also had distinct personalities and interests, resulting in a dynamic classroom environment. Aiden was one of two-fifth graders and a new student to The Anchor School who was often in his own world. Bryan and I often wondered how he would function in a more typical school environment with tighter structure, as here he was allowed to do his own thing and seemed to float through the course. When he was interested in the content, he would engage members of the teaching team in critical conversations, but often when we checked on him he would be searching for irrelevant things on the internet and waiting for instruction from his group. Once he even lost his group (which is hard to do at a small school) when he had not noticed they left their study room to film their final project.

Ashley was a conscientious student and seemed to want to please the teaching team, which was a reason she was not chosen to be interviewed, as Bryan and I were afraid she would say what she thought we wanted to hear. She was a member of the GSA and wanted to promote marriage equality. Rosette was friends with Ashley and Ally, and on the recordings she was often giggly which caused me to unfairly judge her as "not serious" about her learning. In contrast, her survey results showed she thought deeply about social justice issues from class. These three often worked together, although Ashley also worked with Justin Case and Sum Dood during the second unit.

Justin Case was one of our seventh graders. He enjoyed math and was a critical thinker, often discussing the meaning behind words and numbers more often, or sooner in the lesson or unit, than his classmates. Justin Case worked with Sum Dood in each unit. The two of them, along with Sue Denim (which sounds like pseudonym if spoken), chose

their pseudonyms together during the first unit. Then, they pretended they were hosting a podcast as they played with the audio recorder during group work. Any time a teacher walked into their study room, they would announce "welcome to the podcast!" and addressed an imaginary audience while they worked on their research. Sue Denim was often frustrating to us teacher-researchers, as he only wanted to talk about issues he already knew about. He was often distracted, tried to distract his group mates, and engaged in passive-aggressive behavior when he did not want to complete assigned tasks such as turning his back when Bryan and I entered his study room and typing loudly to drown out our voices. Rounding out our seventh-grade group is Izzie, one of the quieter students in whole-class discussions. She usually worked with Mia, and was more talkative in her small groups, speaking up if she did not agree with the group's direction.

Commonalities Across Students

While the students had distinct personalities and interests, they had commonalities that effected how they entered our class and interacted with social justice issues. The primary one is privilege. There is no school bus at The Anchor School, except to use for sports and field trips, so every family must have the ability to drive their students to school. You would not necessarily know students were privileged by the way they acted, however. Snobbery was not something I witnessed among the students. But I overheard several casual conversations about getting the latest iPhone, tablet, laptop, or gaming system, which caused me to raise my eyebrows in surprise. Students also talked about nice vacations they went on, or parents who had prestigious careers at one of the local universities, or in medical or technical fields. More obviously a site of privilege is the fact that The Anchor School is private. While there are scholarships available (and some of our students may have received scholarships, but this was not information we sought), in general familial financial stability and wealth is required to attend.

Privilege was also strongly tied to whiteness in this space. A teacher told me that during the fall trimester in which our study took place a student called another student "the N word" for the first time in staff memory, and the staff had no idea how to handle the situation. According to this teacher, race in contemporary America was not widely discussed at school, let alone how contemporary conceptions of race are tied to the

past. Lessons about the Civil Rights Movement, while extensive at this school, were not related to present-day racism. This, combined with the fact that students did not see racial diversity around them, made talking about current events involving race (like the murder of Michael Brown) difficult for them.

This lack of knowledge about race relates to Bauman's (2004) work on privileged White students, who she described as living inside a bubble. Those outside the bubble remained unnoticed and the school where she conducted research felt like summer camp where the community sat under a "cloud of niceness" (Bauman, 2004, p. 200). Though students in *Math for a Cause* could recognize that a White cop killing a Black teenager is suspicious and likely racist, they remained uncertain. As I discussed with teachers at The Anchor School, the students were likely grappling with questions such as: What does it mean that they are White, are they bad too? The few Black students they know are nice—does that mean the news might be biased? What does that say about their school? These uncomfortable questions are perhaps harder for the White students to address in their nearly all-White space, where racial oppression is seen as something that took place in the past and was bad, but it is probably fine now. The question seems to remain: How can the school claim to be a place of inclusion, if it seems there is no real effort (or at least no visible effort) made to diversify the student and staff population? These questions hang as the river journey begins.

2.4 A Summary of The Anchor School Environment

While I have relayed here details about The Anchor School, no picture of a school can ever be complete. Schools are complex systems working under multiple frameworks of normality and dominance. The communities immediately surrounding The Anchor School were semi-rural, though it was in-between two urban areas that housed large research universities, medical facilities, and tech companies. The surrounding population was predominately White, with the larger urban area having a large Black population as well, with a smaller Latinx population. The school, however, remained primarily White. Same-sex marriage was not yet federally legal in 2014, though some states recognized it, and during the study our state became one of these due to a circuit court decision. Students in our class had an easier time, perhaps due to their school environment, discussing contemporary LGBTQ+ issues than

issues of contemporary racism; however, they learned more about historical racism and the Civil Rights Movement than most students in public schools. While service was highly valued at The Anchor School, social justice was not necessarily practiced, to some teachers' frustration. This complicated amalgam of current events, school values, and school norms and practices all affected our river.

References

Bacon, M. H. (1986). *Mothers of feminism: The story of Quaker women in America*. San Francisco: Harper & Row.

Bauman, A. (2004). Cracks in the armor: The unspoken lives of white privilege. In G. Noblit, S. Flores, & E. Murillo, Jr. (Eds.), *Postcritical ethnography: Reinscribing critique* (pp. 189–214).

Bradney, A., & Cownie, F. (2000). *Living without law: An ethnography of Quaker decision-making, dispute avoidance, and dispute resolution*. Aldershot: Dartmouth.

Conrad, R., & Nair, Y. (Eds.). (2010). *Against equality: Queer critiques of gay marriage*. Lewiston: Against Equality.

Duggan, L. (2002). The new homonormativity: The sexual politics of neoliberalism. In R. Castronovo & D. D. Nelson (Eds.), *Materializing democracy: Toward a revitalized cultural politics* (pp. 175–194). Durham, NC: Duke University Press.

Furco, A. (1996). Service-learning: A balanced approach to experiential education. In *Expanding boundaries: Service and learning* (pp. 2–6). Washington, DC: Corporation for National Service.

Heath, D. H. (1996). *The peculiar mission of a Quaker school*. Lebanon, PA: Pendle Hill.

Perry, K. (2008, June 17). I kissed a girl. In *One of the boys* [CD]. Hollywood, CA: Capitol Records.

CHAPTER 3

Math for a Cause: Preparation for the Journey

No river trip begins without preparation. Before my co-researcher Bryan and I began working with Morgan, our cooperating teacher, we needed a design plan for both the course and data collection. I also researched how other teacher-scholars had approached social justice pedagogy, queer pedagogy, critical literacy, and critical mathematics. In addition, I more carefully designed my research methods based on the research and course design plans. Though adjustments were made as we went down the river, as with any study, this preparation served as my life jacket. When questions came up as the teaching team reflected on our curriculum and student learning, we had the safety device of our background knowledge to rely on in heavy rapids. In this chapter, I will begin with an overview of the research plan to situate the reader. Then, I will discuss the literature that framed this study, and lastly, describe my research methodology in more depth.

3.1 Checking the Water Levels: Research Design Planning

The research got underway when Bryan and I visited the school in the spring of 2014 during morning announcements. Because the school is relatively small, the entire population was in their great room, sitting on the floor and listening patiently. One of the amazing things about The

S. M. Pennell, *Queering Critical Literacy and Numeracy for Social Justice*, Queer Studies and Education,
https://doi.org/10.1007/978-3-030-11584-5_3

Anchor School is that most students sit quietly without fidgeting during announcements, yet they are clearly at peace, rather than some school scenarios where silence has an undercurrent of uneasy compliance. Here, silence is seen as a time of reflection and is not used as punishment, in line with Quaker values. When it was our turn, Morgan explained to the students that we needed their help to plan our course on math and social justice. She began by asking students to raise their hand if they knew what social justice is, and then again if it is an issue important to them. After we read our IRB-approved recruitment script, some of the staff asked questions that helped further clarify the process for students. Interested students approached Bryan and me after the announcements and received their parental permission slips to participate in a focus group a few days later.

This led to a small but robust group: two-fifth graders, one-seventh grader, and an eighth grader. We conducted the thirty-minute focus group during lunch a few days after our morning visit. We found that the students were all interested in issues around homosexuality, specifically marriage equality, as that was a topic of local interest. As a reminder, this focus group took place in 2014, a year before same-sex marriage was legalized at the federal level on June 26, 2015 (Chappell, 2015), and two years after our state had voted for a constitutional amendment that declared marriage was only legally recognized if between a man and a woman. Soon after that date in 2012, I happened to be visiting the school, and it was clear everyone was in mourning. The campus was very quiet, and some high school students were setting up chairs for a meeting to discuss the amendment as a community. Because of this experience, it did not surprise me that the students were still interested in the topic as it affected them personally (there are many LGBTQ+ people in the school community), and movement toward national marriage equality was being made in circuit courts across the country. Nationally and locally, there was a renewed sense of hope.

In the focus group, students also brought up issues of environmental justice, affirmative action, LGBTQ+ rights, and general racial inequality. Along with the popular GSA discussed in the previous chapter, another student club was an environmental group that worked on issues such as reducing waste at school. Bryan asked the focus group if they saw a connection between environmental justice and the other issues of race or homosexuality they brought up, but they were not able to make a more complex, intersectional connection. However, overall, they discussed

social justice in highly sophisticated ways and surprised and impressed us with their thoughts. Astra, for example, showed that she thought of the word "equal" as meaning "same" when she shared that "we can't all be equal…[because] we can't all be one certain thing, everyone must be different." John, the eighth grader, followed up on her thought by explaining that "we can't be all equal, I think we can give people equal opportunity." These students were acknowledging and honoring differences among people and did not want to suggest that everyone should be identical in order to be treated with equity. This follows the school's Quaker mission detailed in the previous chapter.

We saw additional evidence of the Quaker sensibility embraced by the school, as the students did not think it was right to try to change people's beliefs outright about social justice issues, but instead thought it was best to "show them another angle," as Astra put it, or point of view. This statement seemed to align with the Quakers' peaceful, reflective values that prefer listening and silence above shouting for attention. Overall, this small group seemed most comfortable discussing LGBTQ+ issues, particularly same-sex marriage. All of them either had family members or close friends who were queer or had queer parents, so this issue was close to their hearts and something they encountered daily. Astra discussed the environment the most, as she was involved in the student club, and stressed that the environment was important to all people and so everyone should care for it. There was less discussion on racial justice, though John had read about Jim Crow laws and the school to prison pipeline in one of his classes. This lack was not surprising as all the students were White and so had no experience of racial discrimination in their own lives. With this preview of student interests and views in mind, we began planning the course for the fall.

The basic procedure for the overall research design was: (1) Use the previously described focus group to gauge student interests, (2) Meet with Bryan and Morgan to plan the course units, using Morgan's knowledge of the students and school environment, (3) Co-teach the class with the three of us, while I recorded field notes and wrote reflections and analytic memos after classes, and also collected audio of students' group work conversations, whole-class conversations, and written work, (4) Interview select students in the beginning of the course and at the end to see how their thinking about the course topics developed, (5) Interview Morgan at the end of the course and conduct a focus group with other teachers about how The Anchor School approaches social

justice, and finally, (6) Analyze the data set using qualitative analysis software MAXQDA.

To plan the course, Bryan and I met with Morgan in May (following the focus group) and again in August before the school year started. We all agreed that same-sex marriage should be a topic of discussion, but we wanted to begin by focusing on another current event. In August of 2014, a young Black man named Michael Brown was killed by a police officer in Ferguson, Missouri, in the greater St. Louis area. This was a catalyst for the Black Lives Matter movement, an activist movement founded by three Black women, and was a hot topic of debate. We decided to see what students already knew about the topic, find articles for them to read using a critical literacy structure (planned by me), and then we would see what kind of mathematical questions were generated and what instruction they would need to work on these questions (lessons which Bryan and Morgan would lead). The units were described in more detail in the previous chapter (see Table 2.1), but a similar procedure was followed for planning curricular content. More details on methodology are provided at the end of this chapter, but this overview explains how I and my team approached the course. The next section gives an overview of relevant literature that informed the planning.

3.2 Choosing the Boat: Queer Pedagogy

This study was interdisciplinary, but queer pedagogy was the lens through which I viewed and applied frameworks of social justice pedagogy, critical literacy, and critical mathematics. All of these pedagogical frameworks stem from critical pedagogy and are methods of thinking about pedagogy and curriculum rather than specific teaching techniques. More of the literature on queer pedagogy is woven into the next section to illustrate how this worked together with the other frameworks, but this section provides an overview of the topic to help the reader navigate the river. Queer pedagogy is primarily concerned with critically examining and deconstructing heteronormativity and the other boundaries and limits surrounding schooling. Britzman's (1995a) work—which outlines queer pedagogical elements of questioning norms, limits, boundaries, ignorance, and reading practices—is the most influential text in the field. While many who use queer pedagogy are also interrogating queer subjects, queer pedagogy (like its roots in queer theory) can be used to question any topic relating to curriculum and schooling. This

use of queer as a verb—queering—is what sets queer pedagogy as distinct from LGBTQ+ inclusion. Inclusion would include things like learning about queer historical figures such as Harvey Milk or Friday Kahlo without necessarily questioning the heteronormative structures in which they existed, and may instead operate under the idea that everyone is the same, flattening important differences between individuals and groups (Britzman & Gilbert, 2004; Macintosh, 2007; Mayo, 2007). There can be, and often is, overlap between queer pedagogy and LGBTQ+ inclusion: The two do not exist in a binary. The key difference to remember is that queer pedagogy always operates with a critical lens. Parallels can be drawn between this comparison and education focused on racial justice as compared to racial inclusion. For example, students may learn about Martin Luther King, Jr. only by reading his famous "I Have a Dream" speech, but this does not necessarily mean they are learning to critically examine the systemic racism he and other activists worked within. With this in mind, the next section offers more details on the theoretical frameworks and how they were woven together to create the course.

3.3 Checking the Gear: Queer Pedagogy in Context

Social justice pedagogy is dedicated to creating equitable spaces for all students, communities, and teachers. Going beyond simple inclusion of diversity, social justice educators want their students to act on causes they are passionate about and teach them how to do so in the classroom, while also teaching standard curricular components. Rather than being something "extra" that teachers must layer on top of an already full curriculum, social justice pedagogy is a way of thinking through curriculum and teaching practices and incorporating issues and skills that are necessary for students to foster an equitable world. Social justice teaching is fundamental to a democratic society.

For this study, I looked primarily to Rendón's (2009) concept of social justice pedagogy, which like many definitions includes critical consciousness and taking transformational steps toward equity for all social groups. Elements of this definition that stood out, and are particularly relevant to The Anchor School community, include acting with love toward people who are less privileged; working to provide hope and healing for all, but especially those who are marginalized; and a socially engaged spirituality (Rendón, 2009). While not everyone at The Anchor School is Quaker, the school was founded on those values.

While social justice was a motivation for the course curriculum, other critical pedagogies played key parts in the curriculum, design and teaching, with queer pedagogy being the lens through which they were all viewed. Critical literacy is an intentionally political stance toward examining texts (whether print or digital) and is dedicated to social justice. Students are tasked with questioning texts and noticing the power relationships depicted within. Similarly, critical mathematics is also committed to social justice and stems from Freire's (2000) work. Critical mathematics educators want their students to not just "read the word and the world" but read the world through mathematics. Because queer pedagogy was the driving force for building the curriculum, this literature review is organized according to new queer tenets that emerged from an initial analysis of the data from this study: processing, recognizing the puzzle, resisting the average, and abandoning closure (Pennell, 2016). These will be defined below. Furthermore, within each of these four tenets, literature from the multiple disciplines driving this work is considered. In this way, the interrelated nature of the theoretical frameworks is presented.

Processing

Processing is a term often used in queer communities to indicate discussions about emotions, usually in the context of relationships, whether those be friendships or romantic partnerships. Here, I am defining processing in a learning environment as encompassing three elements: dialogue, reflection, and engaged play. When processing, students and teachers are not necessarily looking for a clear answer. Instead, the *action* of thinking through an issue is more important. As noted by Luhmann (1998), queer theory and pedagogy is more about considering knowledge as a question than as a static object. Rather than a finite end-product, students should constantly question their learning and look for ways to expand on their knowledge. Processing is the way students engage with and create knowledge by moving through learning questions.

Dialogue

Dialogue is often cited by critical pedagogues as crucial to teaching critical thinking (e.g., Bakhtin, 1981). By teaching students how to discuss problems with their peers, all involved participants are modeling their own thinking and learning from each other. For the most part, scholars describe dialogue as best when led by students, and where all participants are engaged (both when speaking and listening). In these discussions,

students may be trying to understand a problem or concept, or wanting to convince students that their point of view is important. Student-centered dialogue (as opposed to dialogue where the teacher controls the discussion) is cited by queer pedagogy scholars (e.g., Krywanczyk, 2007), critical literacy scholars (e.g., Janks, 2000), and critical math scholars alike (e.g., Gutstein, 2003) as vital to creating and fostering critical consciousness. Many have found that open, critical dialogue can help to break down societal limitations acting on students, such as Heffernan (2004) and Depasquale (2009) who used dialogue through a critical literacy approach when discussing texts. Terry (2010) found that dialogue in his math lesson on racial discrimination was strengthened by having students dialogue with community members, asking these members how they felt about the disparity between the number of Black males in college compared to those in prison. This shifting of power from teacher to student is a goal of these pedagogies. When a teacher has no clear end-goal for the discussion, this ambiguity queers the classroom.

All dialogue does not have to occur in person or even between people. Dialogue can occur in online spaces, including social media or on less interactive Web sites, such as leaving comments on a news article and engaging in dialogue with other readers. Britzman (2012) also pointed out that queering reading can occur in a dialogic way, as when readers encounter a text that makes them think differently about themselves, they are having a dialogue with the material. This aligns with Luke's (2012) conception of critical literacy as a space for discussion about, and with, a variety of texts.

Reflection

Critical pedagogy stems from Freire's (2000) work, and so many scholars discuss his concepts of "reading the world and the word" and "conscientization," which both require reflection from the teacher and learner. Reflection requires vulnerability, and that is one reason it is crucial to the learning process. When students allow themselves to be vulnerable, they move into a space of discomfort and so can be open to experiences outside of the status quo. Social justice pedagogy, queer pedagogy, critical literacy, and critical mathematics all require reflection from both students and teachers in order to consider not only what is being learned, but how one's sense of self is affected by what you are learning (Luhmann, 1998). While working through social justice issues in education can bring out negative emotions, such as a student who is angered that systemic racism affects them, it can also spur

students to work for positive social change. Students can feel empowered knowing that their struggles are part of a broader system of oppression and not due to personal failings. Teachers must also reflect and draw on critical theories as they do so, being careful not to treat their students as stereotypes due to their group membership, but as individuals (McGee Banks & Banks, 1995). Teachers should not only reflect on their own feelings about a social justice issue, but also think about the community and the historical and cultural contexts (Pennell & Cain, 2016).

Queer pedagogy, with its value of emotions, embraces reflection and encourages teachers and students to continuously reflect on boundaries and limits (Britzman, 1995a). As previously stated, questioning is a large part of a queer pedagogue's practices, and as DePalma (2010) stated, as a method it holds questioning at the center. Critical literacy scholars McLaughlin and DeVoogd (2011) also noted that a primary principle is a "focus on issues of power" which in turn "promotes reflection, transformation, and action" (p. 270). Similarly, Gutstein (2003) wants critical mathematics to help students read the world through math, asking them to reflect on how mathematics affects their daily lives and can be used to create positive change. By engaging in critical self-reflection, teachers and students can investigate not only what their emotions and ideas feel like, but from where these generate and how they can turn to action.

Engaged Play

In queer activist communities outside of education, playfulness is evident in humorous protest signs and satirical reactions to oppression. Incorporating queer play in the classroom may have surprising and beneficial effects, as it did in our course. Engaged play in an education context refers to playing with the material, not in the forms of a structured game like using Jeopardy as a test review, but when students spontaneously play with the material in order to aid their understanding (Pennell, 2016). Teachers can also engage in playfulness. Lewis (2012), for example, approached her college classroom in a playful way by using a performative pedagogy of embodiment, wearing certain clothes or sharing personal photographs with students to illustrate her own life as a queer Black feminist, which allowed Lewis to show her students her identity as more than their professor.

Digital literacy scholars such as Davies (2009) note that critical literacy practices online can also incorporate play as students engage in their own preferred readings of a text. Students can take on online personas, incorporate images and other media, and discuss texts within social networks. Groenke (2008) observed high school students' playful

interactions online with pre-service teachers as they discussed books in the high schoolers' curriculum, while Meyers and Eberfors (2010) saw students from the USA and Sweden engaging in play as they worked in a short story forum together. This latter practice fostered critical thinking as they considered their own cultural values, and the differences between the two countries, through their writing. Online spaces can also allow youth to engage in their social identities, sometimes playing with multiple ones (Dowdall, 2009; Thomas, 2008).

Recognizing the Puzzle

Through processing, students can better recognize the puzzle of social justice issues. While sometimes students may be frustrated to realize the complexity of problems such as racism inherent to the US prison system or the heteronormative bent to medical care, it ultimately serves them better to be able to see a complex web rather than viewing problems as things to be solved with a simple checklist or linear progression. This also queers their understanding; they are looking for the boundaries and limits of a problem and noting that they may have to try multiple approaches to see the positive change they seek. Problem-solving is a necessary skill for students engaging in social justice. As Westheimer and Kahne (1998) noted this can also help them recognize that some problems may be more prescient, and others will get ignored, whether or not that is the intention of activists. This problem discernment is a required piece of students' transformation toward becoming a social actor (Gutiérrez, 2014).

One common thread in the literature on social justice teaching is using interdisciplinary units and co-teaching, which is particularly relevant to *Math for a Cause*, and can help in students recognizing the puzzles before them. Given the intersectionality of social justice issues, it is logical that studying them in a single discipline is difficult. North (2009) observed teachers committed to social justice who combined subjects on their own, or partnered with other teachers, to create units that gave students a more well-rounded view of a topic. This pushing on the limits of standard teaching practices can also serve to queer the curriculum as students see the possibility of learning outside and beyond disciplinary bounds. As noted by Krywanczyk (2007), queer pedagogy can "radically recognize inequalities [as] complex… while simultaneously challenging the foundations of categorical distinctions" (p. 32).

Recognizing the puzzle also means that through reading the world "old certainties" (Britzman, 2012, p. 297) no longer make sense. One may be faced with a new way of seeing the world, which can help to avoid the status quo. This way of reading was also noted by Janks (2000) as "diversity," one of her tenets for critical literacy, which calls for students to read in different ways over a wide range of modes. McLaughlin and DeVoogd (2011) echoed this in one of their critical literacy principles: that this practice should cause participants to focus on a problem and its complexity as well as examining multiple perspectives. Critical mathematics scholars, in calling for students to read the world through math, add to the idea of reading from diverse perspectives. Students using critical literacy may read a newspaper article to discern the power relationships between the groups represented, while critical mathematics students can create mathematical problems to help illustrate those relationships. Another practice critical mathematics researcher Frankenstein (2005) used was showing her students math education research, so they understood the larger picture of what their teachers were learning which helped them understand gaps in their own education. This was empowering to the students and created a level of transparency that is similar to queer pedagogy's dissolving of boundaries. This practice could transfer to sharing background knowledge about other topics in education.

Resisting the Average

Resisting the average means that students and teachers are going against the average, or status quo, way of thinking, especially when those averages are working to oppress marginalized groups. Resisting sameness and normalization are core tenets of queer projects in education (e.g., see Britzman, 1995a; Goldstein, Russell, & Daley, 2007; Luhmann, 1998; Weems, 2007). Again, for queer pedagogy the largest norm of concern is heteronormativity, though queer pedagogy can be used to deconstruct any societal norm. As Moje (2007) posited when discussing social justice pedagogy, "opportunities to learn must not only provide access to mainstream knowledge and practices but also provide opportunities to question, challenge, and reconstruct knowledge (Ladson-Billings & Tate, 1995)" (p. 4). By resisting average depictions of the world, students can work to create their own reality from their emerging knowledge base.

For critical literacy, we can turn to Janks' (2000) category of domination, which she sees as a way of keeping the status quo dominant

through maintenance and reproduction. Janks (2000) feels that we should still give students access to dominant texts because if we "we deny students access, we perpetuate their marginalization" (p. 176). However, using critical literacy, students can learn to see the power and oppression present in these dominant texts and begin the work of overcoming this domination. Frankenstein (2005) discussed critical math similarly, positing that it can allow students to move through the average societal constructs to make our own choices. To achieve this, critical thinking is required, which pushes students to "incorporate prior knowledge, mathematical reasoning and cognitive strategies to generalize, prove, or evaluate unfamiliar mathematical situations in a reflective manner" (Glazer, 2001, p. 13).

Another practice that resists average conceptions of the classroom is the queer practice of blurring boundaries between students and teachers, making each group closer to equals in approaching learning. Boundaries are also blurred by critical mathematics scholars who show their students that the lines between things that are "math" and things that are "not math" are only in textbooks, not reality. This also works with concepts of critical literacy, where the kind of text that students can read is only limited by imagination and resources. Students may apply critical literacy skills to magazines, social media sites, or multimodal texts like advertisements. Blurring these boundaries helps students to move beyond average ideas of what each disciplinary subject is meant to do, and use their learning in a more holistic way.

Abandoning Closure

Social justice issues are not easily solved, and so activists must get used to issues not being completely solved in the move toward equity. Abandoning closure fits within a queer framing because in queer pedagogy's desire to remain outside of normativity, it "celebrates the unformed, [and] inchoate" (Turner, 2000, p. 9). Furthermore, queer people do not necessarily live within gendered or other binaries. While all pedagogy should be flexible, queer pedagogy may be purposefully open and uncertain to challenge students and teachers to question not only heteronormativity, but also the norms of instruction, schooling, and content. This lack of concrete answers can cause students to struggle, yet struggle is seen by many queer pedagogues as a necessary part of an emancipatory, queer education. Scholars have written about this

inclusion of struggle using other words such as "crisis" (Kumashiro, 2001), "problematize" (Macintosh, 2007) and "trouble" (Goldstein et al., 2007; Meyer, 2007).

These ideas are not exclusive to queer pedagogy; many researchers working toward social justice describe the necessity of uncertainty to move toward critical consciousness (ex. Hytten, 2008). Returning to Janks' (2000) tenets of critical literacy, she defines the design paradigm as focused on multiple ways of creating texts which "recognise the importance of human creativity and students' ability to generate an infinite number of new meanings" (Janks, 2000, p. 177). A teacher practicing critical literacy will let students explore these new meanings without enforcing a singular interpretation. This is also seen in critical mathematics. Ukpokodu (2011) noted that, in a break from traditional math classrooms, teachers should appreciate and encourage multiple correct solutions to a problem. Gutstein (2003), in discussing a unit on racism and housing costs, found that sometimes students would have opposing answers when using the same data which served as an illustration of the complexity of math in real-life situations. Warnick and Stemhagen (2007) also warned that teaching students there is a singular answer in math may translate to a mindset of singular answers for moral problems, which goes against the idea of a critical consciousness. While abandoning a single solution may be frustrating to students who have a normalized view of mathematics, embracing multiple answers and abandoning closure can help students continue to construct their own problems (whether using texts, mathematics, or a combination) and change their mindset of their own learning as well as the social problems to which they are attempting to apply their learning.

Summary

Viewing social justice through a queer framework, while using tools of critical literacy and critical mathematics, allows one to see the similarities between the four pedagogical frameworks. All wish for students to develop a critical consciousness through which to view social problems, leading to action to create a more equitable world. By looking at the unique features each field emphasizes, I attempted to create a curriculum that pushed boundaries of what classrooms and learning "should" look like, to the point of it being beyond my own comfort at times. I sought to create an interdisciplinary classroom, in collaboration with

math experts Bryan and Morgan, that would enable students to read texts for both their literary and mathematical content and potential. I wanted students to see how they could apply their learning to real-life situations and that making multiple attempts to solve a problem was a positive approach rather than an indication of failure.

3.4 Planning the Route: Prepping to Enter the River of *Math for a Cause*

In an attempt to capture what occurred during *Math for a Cause*, I used post-critical ethnography (Noblit, Flores, & Murillo, 2004) through a lens of queer methodology (Browne & Nash, 2010), which like queer theory and pedagogy focuses on challenging boundaries. Because of the complexity of the framing of this study, I had several research questions and framed them through the lens of each particular field. Looking back, I realized I was viewing my research questions in a normative lens when I should have queered them and blended the boundaries between each theoretical field. I will return to this in the conclusion, but here I will relay my research questions as they stood at the beginning of the study. The initial primary question was about social justice pedagogy, drawing from Rendón's (2009) definition:

1. How does queering literacy and mathematics for social justice promote a social justice mindset and action in students, as seen through these criterion: (a) having a critical consciousness, (b) taking action to give people from all social groups equal access to resource and opportunities, (c) acting with love and compassion, (d) providing healing and hope for all people, and (e) participating in a socially engaged spirituality?

As mentioned previously, this definition was chosen because The Anchor School was founded on Quaker values. This effected the culture of the school (explored in the previous chapter), and thus the way our students related to the world and to social justice. Some of these Quaker values included listening, stillness, and peace. This was evident in the briefest interaction with students from The Anchor School and so must be considered in any research conducted at the site.

My secondary questions drew from queer pedagogy, critical literacy, and critical mathematics, in turn:

2. Is there evidence of queering (both in the curriculum and in students' work and conversations), as seen by: questioning norms, limits, ignorance, and reading practices (Britzman, 1995a) and the queering of everyday moments (DePalma, 2010).
3. Are students performing acts of critical literacy, as seen through these practices: coding, text-meaning, pragmatic, and critical (Freebody & Luke, 1990)?
4. Are students using the above practices in critical math? How are these practices enabling students to: use mathematics to read the world, use mathematics as a tool to analyze social issues; look for relationships between the social issues (Gutstein, 2003)?

As the study began, it was evident that the second question was really the primary question and colored how the students worked through critical literacy and mathematics. In my initial data analysis, I looked for evidence of the tenets above in the data set. For queer pedagogy, I sought examples of students questioning norms about mathematics, social justice, or their school, for example. The critical literacy tenets relay how readers work through text. Coding and text-meaning are the most practical and basic: Students read the text and if they can comprehend how the text is structured, they understand it. Pragmatic practices are when a student knows how to use a text, while the last tenet of critical practices moves to critical literacy. Here, the student analyzes the text for power relationships, searching for things such as author positionality. Lastly, in mathematics I searched for examples of students reading the world through mathematics, i.e., seeing how mathematics within texts are used to describe social justice situations. I expected that the tenet of using mathematics as a tool for analysis would occur when students created and attempted to solve their own mathematical questions, and I hoped that this would allow them to see relationships between social issues studied in class, such as racial discrimination and racial populations in prisons. Figure 3.1 illustrates how these theoretical frameworks worked together in practice.

Ethnographic and Queer Methods

Ethnography is generally defined as qualitative research that takes place in "the field" for an extended period of time. This field work includes observations, interviews, reflections, and analysis, and at times

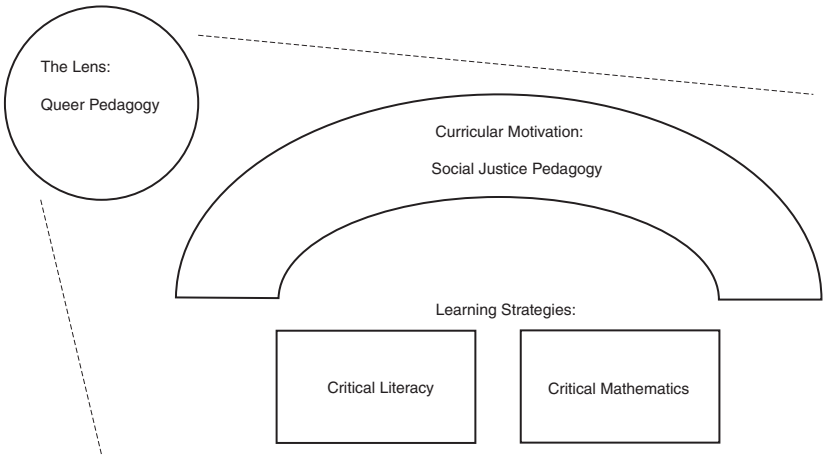

Fig. 3.1 Relationships between curricular frameworks in the study

participation, so that ethnography goes beyond the data collection itself and into the process of creating a narrative from the data (Goodall Jr., 2000). Ethnographers seek to use "thick description" (Geertz, 1973) which Coffey and Atkinson (1996) noted can lead to using a variety of analyses to find themes and metaphors.

Ethnography has taken many turns since its European colonialist beginnings where a typically White male travelled to foreign lands and viewed their research subjects as exotic others (see, e.g., Malinowski, 1950). For this study, I used a post-critical ethnographic frame (Noblit et al., 2004), which is more a way of thinking about ethnography rather than specific techniques. Applying a post-critical lens means rejecting a claim to objective knowledge and an "interrogation of the power and politics of the critic himself/herself as well as in the social science studied" (Noblit et al., 2004, p. 19). Post-critical ethnography also seeks out differences, rather than looking for a sameness, making it a good choice for a queered research lens. Continuing on a queer track, post-critical ethnographers find the binary of theory and method false. Methods themselves are seen as theories, and so the two are not seen as distinct entities. This view of theory and method meshed with my own worldview and beliefs about research, making it a good fit.

Stemming from queer theory, which has a distaste for all socially constructed binaries, it should be no surprise that queer methodologies

explore the artificial binaries of theory/method (Boellstorff, 2007) and data/theory (Weiss, 2011). Ultimately, queer methodologies view all three elements as constitutive of each other with no clear boundary between them. Queer theory can affect qualitative methods in a variety of ways, including how the research design is constructed, how the field is conceptualized, and how data are collected and analyzed. Using queer theory can allow methodologists to accept the slippages and instability that are inherent for all qualitative research. Queered methods are also post-structural (Britzman, 1995b; Plummer, 2005; Talburt, 1999), another reason they work well with post-critical ethnography. Queer methods do not necessarily include radically different ways of data collection, but they do mean a greater attention to the way data, the field, and research projects are constructed by both the researcher's norms and institutional norms. Because this study incorporated queer pedagogy, which encourages a disruption of curricular norms, it seemed natural to include queer methods to ensure that I was also questioning and reflecting on my research norms.

Continuing the discussion of post-critical ethnography, Hytten (2004) emphasized that in education these methods have a fluid process, with constant communication between researchers and their collaborating teachers, meaning that researchers value teachers as knowledge producers with important voices. I greatly valued Morgan's input for her content knowledge of middle school mathematics as well as her deep knowledge of the students, and the school's values, especially those pertaining to social justice. In line with post-critical sensibilities, I believe that ethnography should be collaborative and reflexive (Lawless, 1992), allowing the ethnographer to be a "vulnerable observer" (Behar, 1996) who is open to changes in mindset and methods as necessary.

Hytten (2004) also cautioned that researchers engaging in post-critical ethnography should engage in deep self-reflection to ensure they are not abusing their power in the collaborative relationship. This use of power may not be intentional, so researchers should question if in their quest to empower their subjects they are actually taking over. Part of this self-reflection includes abandoning the assumption that the researcher knows more (about the world, power, and the context of the study) than the subjects. Hytten (2004) suggested five criteria for post-critical ethnography: (a) collaboration, (b) dialogue between researcher and subjects/collaborators regarding research findings, (c) findings should be accessible to subjects, (d) "macro understandings" from the work should not be

rigidly defined, but should keep the flexibility inherent to the method, and (e) it should be pedagogical in a Freirean sensibility (p. 104).

This study aimed to adhere to Hytten's (2004) proposed criteria but did not always succeed. This study was collaborative by design, as I worked with another researcher and a classroom teacher, so the study was also dialogic. However, it was not as collaborative as I originally planned before speaking with Morgan in detail. As she was busy with a full teaching schedule, as well as serving on time-consuming school committees, she did not have the time to look at data or findings together or to create materials (though she did create some materials that proved vital to student learning). She viewed the course as belonging to Bryan and me and expressed that she wanted us to take the lead. While we did share with her a transcript from the previously discussed focus group when the three of us met to plan the class, she did not have time or interest in looking at transcripts of later interviews. Instead, I summed these up for her in person or via e-mail. We did, however, engage in constant reflective conversations at the end of each class so that we could plan and adjust as needed. Bryan also had less time for collaboration as he had many other academic duties at the time, was only able to attend half of the classes, and did not take part in the data analysis. However, we did have many reflective conversations that assisted me in the analysis process. For the other criteria, the overall themes were flexible throughout my analysis and I abandoned my strictly defined criteria from my initial research questions to allow for the strongest themes inherent in the data to shine through. This is one way the research was pedagogical in a Freirean mode, as there was constant problem-posing with no clear, singular path.

Data Collection

A variety of data was collected during the course. Students completed a survey in the beginning asking their experiences and thoughts on social justice issues as well as mathematics. Questions in this initial survey included: (a) Do you enjoy mathematics? (b) What sorts of "causes" do you think might be able to be addressed through mathematics? (c) Describe "social justice" in your own words, and (d) Describe a time when you witnessed inequality or unfairness in your everyday life, with a follow-up question asking them to reflect on their feelings about their example. We gave students a follow-up survey at the end of the course to gauge their growth. These questions included general reflective questions about the course such as "what was your favorite thing in this class?" and "what challenged you

most in this class" We also asked them to again "define social justice in your own words," "describe how you feel about social justice," and "describe what it means to 'do math'" and how they feel about math in general.

During each unit, I left student groups with audio recorders, so I could learn how they were working through the material by listening to their discussions. I showed them how to turn them on and off and gave them control over their use, though I did encourage them to leave the recorder on for the whole time. This was the richest data and is what many of the narratives shared in this book draw from. To my delight, the students loved the recorders and some incorporated them into their play with the material, making the recorder almost another group member. I also collected students' written work, as for each article a group read they completed handouts that assessed their critical literacy skills (see Fig. 2.1 in the previous chapter), and then they completed (well, sometimes completed) another handout as they wrote and worked through their own mathematical inquiries inspired by their readings (see Fig. 2.2 in the previous chapter). Students did not always put the same effort into these small writing exercises as they did into their robust conversations, so the student work was not a primary site of analysis, but rather served to support the transcripts. From a teaching perspective, the three of us were able to move between groups and talked with them frequently, so in combination with their work these conversations allowed us to asses if students were (a) critically analyzing articles on social justice, (b) using their mathematical skills to evaluate topics of social justice, and (c) how they were communicating their ideas on social justice and the mathematical support for these ideas with each other.

This data, combined with interviews with four focal participants and Morgan, field notes and reflections written after each class meeting, and analytic memos I wrote throughout the course, were what I analyzed to try to get a full picture of what happened in *Math for a Cause* to assess how the students were moving through their learning processes. In the following chapters, I analyze this learning through the metaphor of river kayaking and share detailed narratives and examples from the classroom.

References

Bakhtin, M. (1981). *The dialogic imagination: Four essays*. Austin: University of Texas Press.

Behar, R. (1996). *The vulnerable observer: Anthropology that breaks your heart*. Boston, MA: Beacon Press.

Boellstorff, T. (2007). Queer studies in the house of anthropology. *Annual Review of Anthropology, 36,* 17–35.

Britzman, D. (1995a). Is there a queer pedagogy? Or stop reading straight. *Educational Theory, 45*(2), 151–165.

Britzman, D. (1995b). "The question of belief": Writing poststructural ethnography. *International Journal of Qualitative Studies in Education, 8*(3), 229–238.

Britzman, D. (2012). Queer pedagogy and its strange techniques. In E. Meiners & T. Quinn (Eds.), *Sexualities in education: A reader* (pp. 292–308). New York: Peter Lang.

Britzman, D. P., & Gilbert, J. (2004). What will have been said about gayness in teacher education. *Teaching Education, 15*(1), 81–96.

Browne, K., & Nash, C. J. (2010). *Queer methods and methodologies.* London: Routledge.

Chappell, B. (2015, June 26). Supreme Court declares same-sex marriage legal in all 50 states. *National Public Radio.* Retrieved from https://www.npr.org/sections/thetwo-way/2015/06/26/417717613/supreme-court-rules-all-states-must-allow-same-sex-marriages.

Coffey, A., & Atkinson, P. (1996). *Making sense of qualitative data: Complementary research strategies.* Thousand Oaks, CA: Sage.

Davies, J. (2009). A space for play: Crossing boundaries and learning online. In V. Carrington & M. Robinson (Eds.), *Digital literacies: Social learning and classroom practices* (pp. 27–42). Thousand Oaks, CA: Sage.

DePalma, R. (2010). The no outsiders project: In search of queer primary pedagogies. *Transformations: The Journal of Inclusive Scholarship & Pedagogy, 21*(2), 47–58.

Depasquale, J. (2009). Working within and against heterosexist and homophobic schools: Social justice and high school journalism. In R. Rogers, M. A. Kramer, M. Mosley & Literacy for Social Justice Teacher Research Group (Eds.), *Designing socially just learning communities: Critical literacy education across the lifespan* (pp. 159–170). New York, NY: Routledge.

Dowdall, C. (2009). Masters and critics: Children as producers of online digital texts. In V. Carrington & M. Robinson (Eds.), *Digital literacies: Social learning and classroom practices* (pp. 43–64). Thousand Oaks, CA: Sage.

Frankenstein, M. (2005). Reading the world with math. In E. Gutstein & B. Peterson (Eds.), *Rethinking mathematics: Teaching social justice by the numbers* (pp. 19–28). Milwaukee, WI: Rethinking Schools.

Freebody, P., & Luke, A. (1990). Literacies programs: Debates and demands in cultural context. *Prospect: An Australian Journal of TESOL, 5*(3), 7–16.

Freire, P. (2000). *Pedagogy of the oppressed* (30th anniversary ed.). New York: Continuum.

Geertz, C. (1973). Thick description. In *The interpretation of cultures* (pp. 3–30). New York, NY: Basic Books.

Glazer, E. (2001). *Using internet primary sources to teach critical thinking skills in mathematics*. Westport, CT: Greenwood Press.

Goldstein, T., Russell, V., & Daley, A. (2007). Safe, positive and queering moments in teaching education and schooling: A conceptual framework. *Teaching Education, 18*(3), 183–199.

Goodall Jr., H. L. (2000). *Writing the new ethnography* (Vol. 7). Lanham, MD: AltaMira Press.

Groenke, S. L. (2008). Missed opportunities in cyberspace: Preparing preservice teachers to facilitate critical talk about literature through computer-mediated communication. *Journal of Adolescent & Adult Literacy, 52*(3), 224–233.

Gutiérrez, L. A. (2014). Youth social justice engagement in the face of Anti-Latina/o immigrant illegitimacy. *The Urban Review, 46*(2), 307–323.

Gutstein, E. (2003). Teaching and learning mathematics for social justice in an urban, Latino school. *Journal for Research in Mathematics Education, 34*(1), 37–73.

Heffernan, L. (2004). *Critical literacy and writer's workshop: Bringing purpose and passion to student writing*. Newark, DE: International Reading Association.

Hytten, K. (2004). Postcritical ethnography: Research as a pedagogical encounter. In G. W. Noblit, S. Y. Flores, & E. G. Murillo (Eds.), *Postcritical ethnography: Reinscribing critique* (pp. 95–105). Cresskill, NJ: Hampton Press.

Hytten, K. (2008). Critical thinking, social justice and the role of philosophy. In J. Diem & R. Helfenbein (Eds.), *Unsettling beliefs: Teaching social theory to teachers* (pp. 185–200). Greenwich, CT: Information Age Publishing.

Janks, H. (2000). Domination, access, diversity and design: A synthesis for critical literacy education. *Educational Review, 52*(2), 175–186.

Krywanczyk, L. (2007). Queering public school pedagogy as a first-year teacher. *Radical Teacher, 79*, 27–34.

Kumashiro, K. (2001). Queer students of color and antiracist, antiheterosexist education: Paradoxes of identity and activism. In K. Kumashiro (Ed.), *Troubling intersections of race and sexuality: Queer students of color and anti-oppressive education* (pp. 1–25). Lanham, MD: Rowman & Littlefield.

Ladson-Billings, G., & Tate, W. F. (1995). Toward a critical race theory of education. *Teachers College Record, 97*(1), 47–65.

Lawless, E. J. (1992). "I was afraid someone like you…an outsider…would misunderstand": Negotiating interpretive differences between ethnographers and subjects. *Journal of American Folklore, 105*(417), 302–314.

Lewis, M. M. (2012). Pedagogy and the sista' professor: Teaching black queer feminist studies through the self. In E. Meiners & T. Quinn (Eds.), *Sexualities in education: A reader* (pp. 33–40). New York: Peter Lang.

Luhmann, S. (1998). Queering/querying pedagogy? Or, pedagogy is a pretty queer thing. In W. F. Pinar (Ed.), *Queer theory in education* (pp. 141–156). Mahwah, NJ: Lawrence Erlbaum Associates.

Luke, A. (2012). Critical literacy: Foundational notes. *Theory into Practice, 51*(1), 4–11.

Macintosh, L. (2007). Does anyone have a band-aid? Anti-homophobia discourses and pedagogical impossibilities. *Educational Studies, 41*(1), 33–43.

Malinowski, B. (1950). *Argonauts of the Western Pacific: An account of native enterprise and adventure in the Archipelagoes of Melanesian New Guinea, by Bronislaw Malinowski… with a Preface by Sir James George Frazer… With 5 Maps, 65 Illustrations, and 2 Figures.* London: Routledge & K. Paul.

Mayo, C. (2007). Intermittently queer. In N. Rodriquez & W. Pinar (Eds.), *Queering straight teachers: Discourse and identity in education* (pp. 183–200). New York, NY: Peter Lang.

McGee Banks, C. A., & Banks, J. A. (1995). Equity pedagogy: An essential component of multicultural education. *Theory into Practice, 34*(3), 152–158.

McLaughlin, M., & DeVoogd, G. (2011). Critical literacy as comprehension: Understanding at deeper levels. In D. Lapp & D. Fisher (Eds.), *Handbook of research on teaching the English language arts* (3rd ed., pp. 278–282). New York: Routledge.

Meyer, E. J. (2007). "But I'm not gay": What straight teachers need to know about queer theory. In N. M. Rodriguez & W. F. Pinar (Eds.), *Queering straight teachers: Discourse and identity in education* (pp. 15–32). New York, NY: Peter Lang.

Moje, E. B. (2007). Developing socially just subject-matter instruction: A review of the literature on disciplinary literacy teaching. *Review of Research in Education, 31*(1), 1–44.

Myers, J., & Eberfors, F. (2010). Globalizing English through intercultural critical literacy. *English Education, 42*(2), 148–170.

Noblit, G. W., Flores, S. Y., & Murillo, E. G. (2004). *Postcritical ethnography: Reinscribing critique.* Cresskill, NJ: Hampton Press.

North, C. E. (2009). *Teaching for social justice?: Voices from the front lines.* Boulder, CO: Paradigm Publishers.

Pennell, S. M. (2016). *Queering the curriculum: Critical literacy and numeracy for social justice* (Doctoral dissertation), The University of North Carolina at Chapel Hill.

Pennell, S., & Cain, J. M. (2016). Adorned: Moving from decoration to disposition in social justice. In J. Diem (Ed.) *The social and cultural foundations of education: A reader* (pp. 148–165). San Diego, CA: Cognella Academic Publishing.

Plummer, K. (2005). Critical humanism and queer theory. In N. Denzin & Y. Lincoln (Eds.), *The Sage handbook of qualitative research* (pp. 357–373). Thousand Oaks, CA: Sage.

Rendón, L. I. (2009). *Sentipensante (sensing/thinking) pedagogy: Educating for wholeness, social justice and liberation* (1st ed.). Sterling, VA: Stylus Publishing.

Talburt, S. (1999). Open secrets and problems of queer ethnography: Readings from a religious studies classroom. *International Journal of Qualitative Studies in Education, 12*(5), 525–539.

Terry, C. (2010). Prisons, pipelines, and the president: Developing critical math literacy through participatory action research. *Journal of African American Males in Education, 1*(2), 73–104.

Thomas, A. (2008). Community, culture, and citizenship in cyberspace. In J. Coiro, M. Knobel, C. Lankshear, & D. Leu (Eds.), *Handbook of research on new literacies* (pp. 671–698). New York: Lawrence Erlbaum and Taylor & Francis.

Turner, W. B. (2000). *A genealogy of queer theory.* Philadelphia: Temple University Press.

Ukpokodu, O. N. (2011). How do I teach mathematics in a culturally responsive way? Identifying empowering teaching practices. *Multicultural Education, 18*(3), 47–56.

Warnick, B. R., & Stemhagen, K. (2007). Mathematics teachers as moral educators: The implications of conceiving of mathematics as a technology. *Journal of Curriculum Studies, 39*(3), 303–316.

Weems, L. (2007). Un/fixing the fiend: Queering pedagogy and dangerous desires. *Educational Studies, 41*(3), 194–211.

Weiss, M. (2011). The epistemology of ethnography: Method in queer anthropology. *GLQ, 17*(4), 649–664.

Westheimer, J., & Kahne, J. (1998). Education for action: Preparing youth for participatory democracy. In W. Ayers, J. A. Hunt, & T. Quinn (Eds.), *Teaching for social justice: A democracy and education reader* (pp. 1–20). New York: Teachers College Press and The New Press.

CHAPTER 4

Students Moving Out of Their Comfort Zones: Primary and Secondary Stability

During our second unit of the trimester, the students in *Math for a Cause* ranked four broad social justice topics (education, the environment, health care, or same-sex marriage) and were tasked with creating a narrower focus within that topic, choosing their own articles, and then creating their math problems from their reading and research. During the early stages of the unit, Morgan asked Bryan and I to check on Aiden (a fifth-grade boy) and Sue Denim (a sixth-grade boy), as they had gotten distracted from the day's goal of finding an article related to a social justice topic (the environment, in their case) and were instead focused on turtles. Not how human interaction or pollution may affect turtle populations, or how the turtle population in an area may be reflective of environmental racism, but turtles in general. Sue Denim explained that he knew enough about turtles already to "write his own article," and spent a lot of time typing up what he already knew. He believed that hunting turtles was wrong, and that people killed them for fun, and he wanted to focus the project on drawing attention to this. He was not interested in reading other articles, though I somewhat convinced him to look for a new-to-him article on turtles from a conservation perspective, as well as another article about a group who hunts turtles as part of their cultural tradition of Santeria. Aiden was letting Sue Denim lead, though he was interested in adding snakes to their investigation. We left the class period with the two of them looking for articles about snakes and turtles from the perspectives of those who use the animals for cultural traditions or ceremonies.

S. M. Pennell, *Queering Critical Literacy and Numeracy for Social Justice*, Queer Studies and Education,
https://doi.org/10.1007/978-3-030-11584-5_4

4.1 Primary Stability

To relate the above example to kayaking, Sue Denim and Aiden were staying in their primary stability (Fig. 4.1). This is the feeling of the boat when it is sitting level on the water. Primary stability usually occurs when the boat is on a lake or a calm river. The bottom of the boat is flat on the water, and the kayaker can sit straight up. In a learning environment, this can serve as a metaphor for a student in their comfort zone. Aiden and Sue Denim continued to stay in their comfort zone for the remainder of the unit. The next class period, our conversation about shifting their research to the uses of turtles by certain cultural and/or religious groups was abandoned. Sue Denim went back to simply typing up everything he knew about turtles. Aiden, whose search skills were not strong, had distracted himself by looking up "people who are afraid of snakes." I let my teacher-self take over and was worried that they were off task and wanted them to use proper search strategies and find articles to read, rather than typing what they already knew. I myself forgot that they were not only off task, but had lost sight of the purpose of the assignment: relating their topic to social justice. Morgan helped me focus on our overall goal, by asking if I minded that they were not talking about social justice anymore. This reflective conversation helped me refocus my own instructional strategies back to our overall goal rather than simply seeking compliance and practice of literacy tasks that I deemed more important than what the boys wanted to do.

I spoke with the boys again, reminding them that social justice must include a focus on a group of people, and Sue Denim found an article about people who used snakes to practice Santeria, and how this practice was against animal cruelty laws. Morgan came in for backup and asked them both to read the article and reminded them to answer the questions about the article on their worksheet. Unsurprisingly, given their lack of interest for our instructional goals and guidelines, they had not looked at the handout which asked them to identify power relationships, author perspective, and to reflect on their own feelings on the topic.

Primary Stability as Resistance

Throughout the unit, the boys continued to largely ignore the assignment and use it to do what they wanted. Naively, I had not considered

Fig. 4.1 A kayaker sitting in primary stability

that students committed to social justice (as I knew they both were given their comments about racial justice during our Michael Brown unit) might use these assignments to reinforce what they already knew, especially if their knowledge is from the relatively liberal end of the spectrum. I suppose I wanted to believe that all our students were advanced in their critical thinking skills, and therefore wanted to think critically. Instead, I had to reflect and reconfigure my expectations. When Sue Denim and Aiden presented their findings on turtles to the class, their classmates pushed back as well. Someone asked them "so what?" in response to Aiden's note on the board during our whole-class sharing that "turtles are cute and kill jellyfish"? "What did that have to do with social justice?" the class asked. Aiden and Sue Denim had not really learned anything or conducted a solid math problem. Instead, they surveyed some classmates about killing turtles, even though the teaching team all discussed with them how that was a biased sample, and no one at the school practiced Santeria. Again, they were not concerned with truly investigating the

issue from a new point of view and were instead only after finding a way to support their preexisting beliefs on the topic.

Sue Denim and Aiden were resisting both the power of the institution, and my own power as researcher-instructor. This is possibly a result of queering the curriculum. By giving the students more free-reign over their learning than was typical, there was the opportunity for students to use their power to derail the intended lesson completely. I had wrongly assumed that only people working under what I deem "conservative" mindsets use research to prove what they already know, rather than looking for new information. It had never occurred to me that this could take place in a class on social justice in an environment like The Anchor School. This naivety meant I had not anticipated students taking advantage of the relative freedom of the class to justify their own socially conscious beliefs rather than learning of different ways of considering a subject. As an advocate for critical pedagogy, this resistance went against how I had hoped students would respond to the curriculum.

This tension between wanting to give students freedom over their learning, but still expecting them to follow my lead relates to Britzman's (2012) question: "can pedagogy admit to the unthinkability of normalcy and how normalcy is being constituted again and again?" (p. 298). I was relying on the normalcy of school to do some of the work for me, despite my efforts to create a different and queer pedagogy. I had considered the norms of a typical English class where nonfiction texts would not include reports of scientific studies, and I had considered the norms of a typical math class where reading such a report and then creating a math problem was beyond the typical scope. Even though I agreed that protecting sea turtles and snakes was important, my teacher identity was annoyed with Sue Denim for refusing to follow directions and purposefully altering the assignment to do what he wanted, rather than what I wanted for him. I did not want the boundary-crossing of queer pedagogy to infringe on what I saw as my ultimate authority as teacher. While my queer and post-critical methodologies allowed me the space to come to this important self-realization, I did not necessarily feel equipped to smoothly work through these feelings about my teaching. This tension is common among critical educators and is not easily resolved, as the norms within schooling are strong and often unconsciously followed even by those of us with the best of intentions to dismantle oppressive systems.

Results of Staying in Primary Stability

Aiden and Sue Denim were two students who stayed in their primary stability not only for this unit but over the course as a whole. On some days, it seemed they did not even get into their kayak, as they were frequently playing, and not in a way that demonstrated they were playfully engaging with the material or topic for the day. During the third unit, when Sue Denim was reunited with his podcast buddies from the first unit Sum Dood and Justin Case, he did not engage in their sophisticated conversations about the readings and data but instead assigned himself the more task-based jobs such as compiling the information and deciding what font to use for their Web site. Once when I went to check on their group, I could not see Sue Denim at all. He had stationed himself underneath the desk, physically removing himself from the main action of his group to perhaps allow him to stay out of their conversations.

Aiden similarly physically removed himself from his group. On an audio recording of his group working on a video about marriage equality, Aiden can be heard talking to himself and looking up information on My Little Ponies on the computer, while in the background his group members are discussing their strategy for making the video. These classmates left to get a video camera, and Aiden did not notice until a few minutes later, when he came to find me to help him locate his team. While Aiden did seem to struggle with focusing in class, which could explain some of his distraction leading to physically distancing himself from his classmates, part of this distance throughout the course was from his disinterest in learning about topics outside of his comfort zone of immediate interests.

This lack of growth was also evident in written work by both boys. On the end-of-term surveys, when asked what they thought of social justice, both Sue Denim and Aiden simply wrote "good." When asked "what does it mean to do math," Aiden wrote "add, subtract" while Sue Denim wrote "math equations like 1 + 1." Their thinking about math, literacy, and social justice had not changed over the course of the trimester. These answers are more remarkable when compared to their classmates, who responded reflectively to all questions and showed great growth, as will be discussed in the following sections.

4.2 Secondary Stability in the Classroom

During a whole-class discussion in the second unit, Morgan led the students through a review of their mathematical calculations, from a worksheet she created so they could practice the numeracy skill of calculating and evaluating percentages. Morgan wrote the math problems based on statistics on the US prison system and race, and in this discussion she was helping students to analyze what their answers meant. She said to the students "Number 3 asks what conclusions can you make from this math. But this looks like a whole bunch of jumbled numbers doesn't it? This is the problem with trying to pull math out of real life things or articles is that you can get stuck on just doing the actual math problems, and then you just have a bunch of numbers and think 'Wait what do all these numbers mean?' So, Sum Dood, can you tell us what all these numbers mean?" Sum Dood replied tentatively, "Well, we have a lot of um- more than half of our uh population is in prison…." He trailed off, uncertain of how to interpret his results as the numbers indicated that the USA had a high percentage of our population in prison, especially when compared to the percentage of the world's population that was imprisoned. Morgan helped to guide his thinking by pointing this out, asking "How about the percentage of the world's population and prisoners, the percentage of the population of prisoners in the world?" Sum Dood responded "Either we're real efficient and catch all the crime, or we're the same amount of efficient as other countries but we just have more crime, or we put a lot of people in jail without investigating enough." Rather than leading Sum Dood, and the rest of the class, to immediately choose one of those answers, Morgan merely responded, "So a number of different things" and continued to ask other students how they were interpreting the data. She never forced them to decide on a definitive answer and continued to pose questions. While Morgan, Bryan, and I had discussed this activity earlier and all agreed that the numbers demonstrated a flawed justice system which disproportionately incarcerated People of Color, she allowed students to come to this idea on their own, leaving open many possibilities for inquiry.

Rather than staying in primary stability, like Aiden and Sue Denim, Sum Dood was moving into secondary stability. In kayaking, secondary stability is the feel of the boat when it is tilted over on its edge (Fig. 4.2). This is necessary when kayakers are navigating through rapids or around obstructions and must use their body to move the boat in order to turn it to work with the current and move around obstacles. In a learning

Fig. 4.2 A kayaker in secondary stability

environment, this relates to students who are moving out of their comfort zone but are still able to continue in the learning activity. They are pushing themselves, but are not to the extreme frustration point, where they abandon their learning (their kayak) and perhaps exit the river (the class) entirely, whether mentally or physically. In their secondary stability, students can tilt their kayak and maneuver around and through difficult material. Though students may feel less stable as they stretch their brains and move, in reality a kayak is more stable through this movement on the edge than when a kayaker works against the current of the river and attempts to stay still.

4.3 Stability and Mobility in Theory

My musings on stability are what first led me to use a kayaking metaphor for student learning. In education scholarship that uses queer theory as a lens, an unintentional binary is often created between the concepts of *stable* and *shifting* identities, which I will illustrate in the following

examples from the literature. In Jackson and Mazzei's (2012) exploration of analyzing qualitative educational research with post-structural theories, they explained that Foucault was working against the idea of a stable subject and instead was interested in the subject as formed by shifting identities. The authors further explain that "subjectivity is not *stable*, but is constructed in relationships with others and in everyday practices" (p. 52, emphasis added). Rather than static, fixed subjects Foucault believed in subjects that had blurred borders, making Foucault's work influential with queer theorists. Similarly, Jackson and Mazzei (2012) also used the word stable to describe Butler's ideas of performativity, in that she was working to "unsettle the *stabilizing* categories" (p. 72, emphasis added) of socially constructed gender roles. Here, the use of "unsettle" implies that these "stabilizing" concepts are unmoving and static. The concept of "stable" as a synonym for "static" is found in other examinations of queer theory's use in education: such as Thein and Kedley's (2015) queer reading of teaching young adult literature with LGBTQ themes, where they stated "in Queer Theory, gender, sex, and sexuality are regarded as *unstable*, temporal categories that *shift* over time" (p. 6, emphasis added).

This juxtaposition of *stable* in opposition to *shifting* in scholarship implies that something is only *stable* if it is immobile. However, I argue that shifting identities and deconstructing identity categories do not mean identity moves from stable to unstable. I argue that identity does not only shift position but is *mobile,* meaning it can move easily. The word mobile has a different connotation than unstable and can also include various degrees of temporal stability while in motion. Meaning, stasis is not necessary for stability, and thinking of stability as static is unnecessarily limiting. In queer scholarship, stability is used as a euphemism for normative, and so something to work against. Yet by expanding the concept of stability to include primary and secondary, we can see how students can move between these forms of stability as necessary for their learning and embrace the mobility required. Stability does not have to mean static, normative, and perpetually problematic. Instead, stability can be mobile, allowing a learner to adapt to situations flexibly and shift position according to current circumstances.

This notion of stability brings me back to the kayaking metaphor. As my father taught me, the boat is more stable when it is in motion than when it is still. If you try to still the movement, you are more in danger of tipping over. For example, if a kayaker panics while in a rapid and tries

to stop the boat, they will usually tip over as the boat is not meant to be immobile in that situation. Sometimes this may happen when a new kayaker needs to move from their primary stability (keeping the bottom of the boat flat on the water) into their secondary stability (tilting the boat on its edge to move with the current). When in a classroom, we want our students to move through the material even when it is difficult. Students can be uncomfortable with instability (Hytten, 2008), but teachers can help them work through this discomfort. When students do not want to make conceptual changes, it is like they are panicking in a rapid and trying to stand in a moving kayak, and thus popping out of their boat (or their learning mindset) rather than working with the river (the course) to keep moving with the current (the curriculum and instruction enacted by teacher and students). Below, I share examples of students working in their secondary stability to demonstrate how it was conducive to learning in *Math for a Cause*.

4.4 Secondary Stability as Beneficial to Learning

The students of *Math for a Cause* who went into their secondary stability often, riding the edge of their own comfort with new material, benefited greatly, as evidenced by their captured conversations, student work, interviews, and the end-of-course surveys. Initially, not all of them found this edge to be a comfortable space and we had to get them through their initial discomfort. As a teaching team, we found that earlier in the trimester students had greater difficulty with problems that did not have an easy answer. This stemmed from their belief, indicated in initial interviews and surveys, that math meant "worksheets" and "textbooks," rather than an exploration or a process. This perception was not through any fault of their own, as in our society we view numbers as exact, as "real," as fail proof. Many also held the common assumption that news was factual. They had an understanding that the news could be biased because of reporters, but not all of them had thought deeply about the implications of author bias and how that can shape how we read a text. As students moved from their primary stability (in this case, their preexisting knowledge of what counted as facts) into their secondary stability (rethinking what facts meant, as well as mathematics as a discipline) these assumptions were questioned.

Students were also pushed into their secondary stability when they were asked to estimate, when there were multiple ways to solve

problems, or when different answers were possible. Most of this confusion was directly related to math, though there was also a connection to social issues. Part of this might have been the age and maturity level of our students. During a focus group on social justice, several teachers at The Anchor School mentioned that there was just something that happened when students were in seventh or eighth grade, as opposed to fifth and sixth, that allowed them to think in more abstract and complicated ways. Perhaps this is true, though in our small class this "something" did not happen consistently across grade levels.

Secondary Stability and Intersectionality

During the second unit, while Sue Denim and Aiden were firmly in their primary stability and writing about sea turtles, another group interested in researching health care were challenging themselves. Jimmy Smith (a fifth-grade boy) found a report on transgender patients' experiences with healthcare services and his group decided to use this to create their math problem (the report was found through the National Center for Transgender Equality's Web site, but is no longer available on that site. It is available in full from the agency who conducted the research, Agency for Healthcare Research and Quality, 2012). The group discussed things about the report that surprised them, such as transgender people facing discrimination from doctors and reporting that they did not feel comfortable visiting the doctor even for things unrelated to their gender, such as flu. The group asked me why doctors would discriminate against their patients: This was a foreign concept to my group of cisgender middle schoolers, whose school advocated for kindness and inclusion. Why would a doctor possibly discriminate against a patient, they wondered? We had a long conversation about what this discrimination may look like, and students were able to consider situations such as "maybe even if a doctor would not be mean to a transgender patient, they could say they did not have any free appointments or try to get them to go to a different office," as Izzie suggested during our discussion. The students were beginning to understand the subtle ways transphobic discrimination could occur.

The report also illustrated that transgender People of Color faced additional discrimination due to their race, and students (without knowing it) discussed how intersectionality effected health care. Intersectionality is a theoretical term referring to the interlocking forms

of oppression that members of multiple minority groups face, such as Black women facing both racism and sexism simultaneously (Crenshaw, 1991). Intersectionality points out that aspects of our identity cannot be separated and affect us all at once. Previously, our students had mostly considered social justice issues as stand-alone entities, though when we discussed Michael Brown there was some speculation about how his gender affected him, and students wondered if a Black woman would have been killed. In this case, students reflected on gender identity for transgender people specifically, and how others might be transphobic because transgender people fell outside their expected norm, rather than only considering the gendered expectations for those who fall within the gender binary. As students continued to think outside of their own experiences, they gained a deeper understanding of issues faced by transgender people and considered the differences among transgender people. They were able to see, by investigating the data found within their report, that transgender People of Color faced more discrimination than White transgender people, as the report stated that 19% of the overall transgender population surveyed were refused medical care due to race, but when this was broken down more specifically, the numbers showed more disparity. American Indian transgender people had a 36% refusal due to race, with Latino/a people at 22%, Black people at 22% and White people at 17%. This data led to a discussion of how the combination of racism and transphobia negatively affected these people and impacted their access to health care. Without moving into their secondary stability and considering these new (to them) ways of moving through the world, this group of students would not have considered how multiple forms of oppression can affect someone for something which many cisgender people and White people take for granted: going to a routine doctor's appointment and expecting equitable treatment.

Secondary Stability as Letting Go

One major learning outcome from students staying in their secondary stability was learning to let go of a singular right answer. This was an especially exciting outcome for their conception of mathematics and has positive implications for conceptions of social justice. Emphasizing a traditional mathematical pedagogy in which there is only one correct method and answer may encourage students to think that there is one correct approach to mathematical inquiry (Warnick & Stemhagen, 2007).

In turn, this may translate to an assumption that social issues also have one right answer and way of approaching them (Warnick & Stemhagen, 2007), leading students to believe in a simple dichotomy of right and wrong. This is something we continually queered with our students as we asked them to think about social justice issues such as racial discrimination in prison systems and causes of educational disparities.

I first recognized this phenomenon when I was comparing the interviews Bryan and I conducted during the beginning of the course with Ally, Jimmy Smith, Mia, and Sum Dood with their interviews after the course was finished. This comparison showed they had gone from thinking of math as something with one right answer to thinking of it as open to possibility. This transformation was echoed in the four focal students' pre- and post- class surveys. For example, Jimmy declared "the meaning of math is endless!" in his post-survey. When Bryan and I asked him during his second interview to elaborate on his definition and feelings about math, he said "There's not one way to do math. There's multiple ways." This was a big conceptual jump from his first interview a month prior when he said that to do math means "It's usually just solve a problem." The "just" in his first answer suggests that the solving was simple or that there was one way to find a solution.

Mia, who in the beginning of the course confessed that she did not really like math and had a very narrow view of it, also experienced an altered way of conceptualizing it. During our post-course interview, I asked her to elaborate on her survey responses. She answered our question "Describe what it means to do math" with "it means to figure out problems and diagrams, it's like a puzzle," and "How do you feel about math?" with "I feel like I'll always be trying to understand it." She elaborated in the interview by explaining "I guess, no one is actually done learning math or an expert on math because you're really always learning." Her point that "no one is actually done learning" illustrates her belief that there is no singular, well-defined end-goal. She is holding on to multiple possibilities, rather than limiting herself to one.

Sum Dood had a similar shift in thinking. In his post-class interview, he said "I don't think the answer is that important" when discussing his feelings about what math is. When we interviewed him the first time he said, "I often try doing it a different way … partly because I want to see if I get the same answer but partly because I'm less likely to have something wrong, but like, just do it differently." It is evident that he did have some conceptual framework of math as more than an answer and

involving a process here, but his primary concern was still a normative one about getting the correct answer. To go from this focus on the right solution, and sharing on the first day of class that he liked math because it has rules, to letting go of the right answer altogether was astounding to Bryan and me. This was not something we were intentionally trying to instill as a new value for our students, but it is one that came about generatively through the queered processing that occurred during the course. As with many of the other results, the messiness of the student-centered class structure that gave students responsibility over their learning and resulted in them spending a lot of time in their secondary stability which led to this new conception.

Results of Prolonged Secondary Stability

The students who moved more frequently in their secondary stability had nuanced answers to the end-of-term survey questions, such as when Rosette responded to the question about her thoughts on social justice with "I think that some things [about social justice] are confusing, and that it's never going to be 'right' for everyone." This uncertainty, rather than demonstrating lack of learning, in fact shows that Rosette knew that concepts of social justice are complex and cannot be answered with generic, blanket solutions for all people. Rosette was initially pushed into her secondary stability during our first unit when she and her group wondered if stereotypes about Black men and their clothing (such as the idea that a hoodie indicates gang affiliation) caused the White police officer to fear Michael Brown. During the second unit, her group investigated education funding and learned that school districts with less funding have, on average, lower standardized test scores. As a private school student who does not have to take standardized tests at the end of the school year, these were new concepts for her and required her to stretch her thinking outside of her own experience. These prolonged moments in secondary stability, rather than lead her to a singular moment of clarity, gave way to a complex and realistic view of the difficulty of social justice work.

The students' answers about math and other curricular components were equally reflective and positive, such as Justin Case's response to "what does this class mean to you?" with "social changes can be made by everyone." Some acknowledged they found math difficult, but most also noted that they enjoyed it such as Ashley who stated, "it is a challenge, but fun!" Similarly, Sum Dood found that making a Web site for the final

unit with Justin Case and Sue Denim was both the most challenging element of the class and what made him the proudest. Students in secondary stability saw their learning as part of a larger journey. They knew that when we reached the take out of the river, or the end of our course, that they were not done. Even Izzie, who responded to the "describe what it means to 'do math'?" question with "math is hard and it does not mean anything to me" answered the following "how do you feel about math?" with "I just keep trying to learn it," indicating she had not given up on gaining knowledge. Students' learning would continue, and social justice was "really important for everyone to think about" (Mia) and "if there was more of it the world would be better" (Jimmy Smith). Overall, the students grew in their conceptions of math and social justice as well as their conceptions of what learning might look like and the products they could create as a result from their learning.

4.5 Teacher Facilitation to Assist with Stability Shifts

Even though our course was student-centered and led, students still needed guidance when navigating difficult concepts. Teachers can act as facilitators and guides as students move into secondary stability, helping them navigate rapids and providing encouragement as students take risks. We did this in a few ways. First, although students were working fairly independently in their small groups, someone from the teaching team would periodically check on each group. This involved more than a cursory "Are you OK?" but a longer check-into engage the students in dialogue about their process. We asked them what they were reading, resulting in summaries, but also how they felt about the material, resulting in more critical inquiry. Sometimes these dialogues became reflective, at times we could clarify misconceptions, and at other times we pushed students to keep considering new ideas and information, thus nudging them into their secondary stability. Secondly, as seen in the example with Morgan leading the lesson on percentages and the US prison system, we posed questions that encouraged critical thinking and further reflection rather than leading students to a conclusion. Our loose classroom structure also aided in students working outside their comfort zone. Students were charged not only with formulating a plan to approach their topic, but sometimes decided their topic on their own, found their own materials, and sifted through online sources that sometimes had conflicting

views and information. This was different from most of their expectations of a typical math class and caused them to reconsider how they approached the subject.

However, as previously mentioned not all students will respond in the way you want them to. Sue Denim and Aiden ignored all of our inquiries and encouragement to look deeper into the material and instead dug in their heels (in Sue Denim's case) or simply ignored our suggestions to pursue what interested them regardless of the day's lesson (in Aiden's case). For these students, I am not sure if a more traditional instructional model would have helped, as I think they would have perhaps been compliant, but I do not think that would have translated to critical engagement. If I were to try again with these two, I may take away even more boundaries. Maybe Sue Denim would have felt satisfied by writing down everything he knew about sea turtles first, and then engaging in a debate with a teacher or classmate who would ask him to defend his points. Maybe in this way, he could have been persuaded to do more research to support his preexisting ideas. This is still removed from social justice, but perhaps with more time and space, he could have gotten to address the course goals. Of course, this may also backfire with the Sue Denims in our classes and illustrates the complexity of teaching when our best-laid plans are easily undone by students with strong wills of their own.

All of these teaching moments, no matter their success, sprung directly from our shared commitments to social justice through a framework of queer pedagogy. We wanted to break down boundaries between students and teachers, and between the students and their own learning. Some students, such as Ally, found this lack of boundaries frustrating and remained uncomfortable in their secondary stability. On her end-of-term survey she stated, "not telling me exactly what to do" was the most challenging element of the course for her, likely resulting in her feeling that the class was "useful, but at times, it gets boring." Yet even Ally ended the course with expanded feelings on math as she learned that numbers are not necessarily truths.

Another impediment to students moving into secondary stability was when we made assumptions about their prior knowledge. As discussed earlier in this chapter, Morgan created a worksheet so that students could simultaneously learn about a social justice issue (the disproportionate amounts of People of Color in US prisons) and review the mathematical skill of calculating percentages. While Morgan had personally taught this skill to many of the older students in the class, they had not retained

it, or at least were not able to apply it to real-life situations. We had assumed that the percentages would be in their primary stability, so that the social issues would put them in their secondary stability as they considered how to interpret the meaning of their calculations. Instead, they needed a refresher on this skill which made them closer to tipping over their boat than was helpful. Rather than riding the edge in a calculated risk, they were in danger of getting so far out of their comfort zone as to be paralyzing. Similarly, when a kayaker feels paralyzed, they may make a dangerous mistake, such as trying to still their boat, which in our metaphor means that their learning stops. So, one of the ways we had to help them be comfortable taking risks and moving into their secondary stability was to ensure that they had the background knowledge to make the shift with confidence. Once they had reviewed (or learned, for the younger students) this mathematical skill, they were better able to paddle through the rapids of a social justice discussion on race and incarceration.

4.6 Conclusion

I do not want to give the impression that it is never okay for students to be in their primary stability. This state is a great one to practice skills they have recently learned, such as reading new texts on their level or on subjects they have familiarity with, or to continue practicing math skills like calculating percentages until they gain confidence. Once students gain this confidence, they are better prepared to continue on their river journey. They will feel safe moving into secondary stability when faced with new information and can tackle new problems while relying on the skills they learned and reviewed in their primary stability. You would not teach a new kayaker how to manipulate their kayak on a river with heavy, dangerous rapids. Similarly, most students need a baseline of knowledge and skills to feel confident in newer, or perhaps dangerous, intellectual situations.

However, if students refuse to move from their primary stability into secondary, that is where learning stalls. When the curriculum is centered on social justice, this movement is crucial as (especially in the case of our privileged students) information about inequity and oppression may be new and challenge students' worldviews. For students who have first-hand knowledge of oppression, reframing their experiences as a result of systemic inequity rather than personal failings also requires a shift in mindset. As teachers know, we must push students to move outside of their comfort zone and into this secondary stability to grow. And once

they have the tools in place—such as their previous knowledge and skills that allow them to continue moving their paddles through the river, or the support of a teacher acting as a life vest—they will find that continuing the motions of learning, even when they have to lean and tilt to navigate their kayak through new materials and ideas, is a form of stability. Stability in motion is just as important as stability in stasis. If they try to stop completely—standing up in their kayak to abandon their learning rather than continuing to paddle—that is when they will flounder the most.

Students will, and should, move back and forth between primary and secondary stability throughout their learning. When engaging students in critical literacy and mathematics, or any form of queer, critical pedagogy, it is important that teachers continue to encourage students to keep moving even if they feel uncertain. This does not necessarily have to mean students need to be "on-task," as that can sometimes be a lost battle, as I learned with Sue Denim and Aiden. Instead, check that students are still engaged in the overall learning goals. Teachers have to monitor when students are in a state of frustration that can be worked through, versus extreme frustration where students shut down and learning becomes temporarily impossible. While in our course we initially took away most forms of scaffolding in an attempt to radically queer our pedagogy and remove as many boundaries as possible, we found that at times this was a hindrance. For example, when we were not carefully vetting their articles students struggled with reading levels beyond their comprehension. When we brought scaffolding back in through a few whole-class lessons where we all looked at the same information (such as described above with the percentages lesson, or a later activity where all students read the same article on same-sex marriage in their community after it became legal at the state level), students were able to continue their journey and go back to their secondary stability. More on these moments of scaffolded pauses will be discussed in later chapters, as more kayaking metaphors for learning are explored.

References

Agency for Healthcare Research and Quality. (2012). Chapter 10: Priority populations. In *National Healthcare Disparities Report 2011*. U.S. Department of Health and Human Services, Publication No. 12-0006. Accessed at https://www.ahrq.gov/sites/default/files/wysiwyg/research/findings/nhqrdr/nhdr11/nhdr11.pdf.

Britzman, D. (2012). Queer pedagogy and its strange techniques. In E. Meiners & T. Quinn (Eds.), *Sexualities in education: A reader* (pp. 292–308). New York, NY: Peter Lang.

Crenshaw, K. (1991). Mapping the margins: Identity politics, intersectionality, and violence against women. *Stanford Law Review, 43*(6), 1241–1299.

Hytten, K. (2008). Critical thinking, social justice and the role of philosophy. In J. Diem & R. Helfenbein (Eds.), *Unsettling beliefs: Teaching social theory to teachers* (pp. 185–200). Greenwich, CT: Information Age Publishing.

Jackson, A. Y., & Mazzei, L. A. (2012). *Thinking with theory in qualitative research.* Abingdon: Taylor & Francis.

Thein, A. H., & Kedley, K. E. (2015). Out of the closet and all grown up: Problematizing normative narratives of coming-out and coming-of-age in young adult literature. In D. Linville & D. L. Carlson (Eds.), *Beyond borders: Queer eros and ethos (ethics) in LGBTQ young adult literature* (pp. 3–20). New York, NY: Peter Lang.

Warnick, B. R., & Stemhagen, K. (2007). Mathematics teachers as moral educators: The implications of conceiving of mathematics as a technology. *Journal of Curriculum Studies, 39*(3), 303–316.

CHAPTER 5

Moments of Active Reflection: Eddies

During our first unit, students were reading articles about the death of Michael Brown, a Black teenager and recent high school graduate who was shot and killed by a White police officer in Ferguson, Missouri. This shooting happened shortly before our term began, and it was gaining a lot of national attention. The Black Lives Matter movement was founded by three women in relation to another Black teen's death by a police officer, and it grew in Ferguson after Brown's death. A group of girls in our class—Ally, Ashley, and Rosette—started to reflect on the larger implications of this incident. They found an article called "Exactly How Often do Police Shoot Unarmed Black Men?" (Lee, 2014) and as Ally was reading it aloud to the group, Ashley began to reflect on how Black men are stereotyped as dangerous. She noted (as I heard later when listening to their audio recording) that usually people "say like 'he was in a hoodie' and he you know 'looked kind of thuggish like he could hurt somebody' but he was really unarmed and couldn't do anything."

Later, when I checked on the girls they wanted to continue this conversation with me. They asked me if I thought the officer was afraid of Michel Brown because of stereotypes, and we discussed what kind of people were stereotyped negatively the most due to their appearance. The students thought that a Black woman would also be stereotyped as dangerous if she wore a hoodie but may not be as feared as a Black man. They also speculated that a White woman was unlikely to face this same discrimination from the police, no matter what she wore.

S. M. Pennell, *Queering Critical Literacy and Numeracy for Social Justice*, Queer Studies and Education,
https://doi.org/10.1007/978-3-030-11584-5_5

This conversation, and others like them, helped students begin to move from seeing racism as individual acts committed by bad people to how these acts fit into systemic racism and institutions of power. Without naming it, they were considering how intersectionality (here, race and gender) impacts stereotypes and how in turn, these stereotypes impact groups of people.

By pausing from their reading and other tasks, they were able to engage in a deeper reflection, which allowed them to understand the nuances of the situation more than if they had kept going in order to finish their work faster. In catching an eddy, students were able to see outside of the situation at hand and see it as part of a larger whole, by looking at the entire river and its banks rather than a single rapid. This systemic awareness can be difficult for students to grasp, and reflection can assist in gaining this awareness.

5.1 River Eddies

Unlike other terms used in this book, an eddy is a feature of the river, not of kayaking. An eddy is a calm spot in the river, protected from the current (see Fig. 5.1). These spaces occur when the current hits

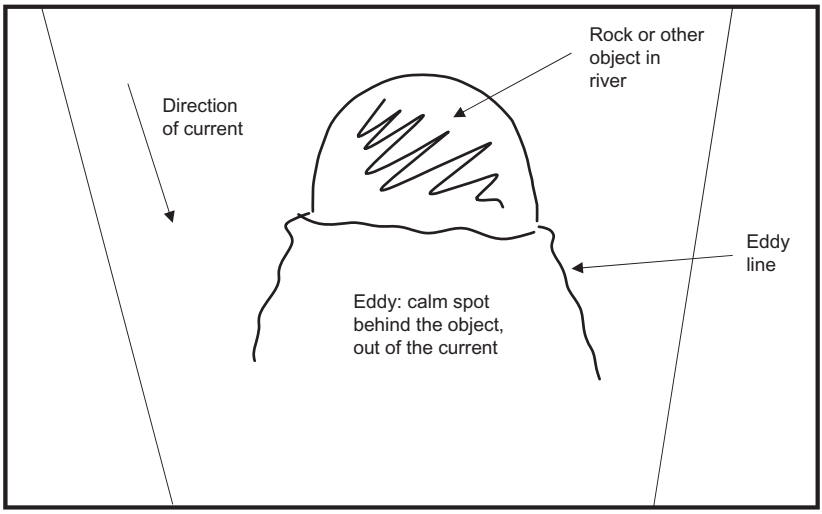

Fig. 5.1 Diagram of an eddy

an obstruction (e.g., a rock, a log, or a man-made object) in the river that sticks out of the water and the space immediately behind the object becomes semi-protected from the current. When in an eddy, kayakers do not need to paddle much: Typically, only minimal movement is required to stay in the eddy. Eddies are used by kayakers (called catching an eddy) for multiple reasons: to survey upcoming rapids and plan their route; to check obstacles in the river to determine if they are safe to paddle around; or simply to rest. In a classroom, the concept of an eddy can symbolize times when students (and teachers) need a moment of rest and reflection. This rest, however, does not mean the students are immobile and passive. To stay in the eddy's pocket, one must remain in motion and so students must be actively engaged in the subject matter. This reflection can allow students to think deeply about a topic or to plan strategies for upcoming learning tasks.

The border of the eddy is called the eddy line. In the water, this line is visible, and if you drift on and over the eddy line you are back in the current. Trying to rest on the eddy line, rather than in the eddy's pocket, is dangerous as you can be pulled back into the current before you are ready, which in heavy rapids could lead to tipping over. Attempting to stay on the eddy line, then, is not as restful as staying in the pocket as the kayaker will have to more vigorously paddle to prevent themselves from being taken by the current. A skilled kayaker may play on this eddy line if the risk of being swept back out by the current will not put them in immediate danger.

5.2 Eddies as a Learning Necessity

As the opening classroom example on racial stereotyping demonstrates, sitting in an eddy allows students to take a breath and reflect on their learning. In a course, teachers can purposefully build these eddies into the curriculum by providing space for students to rest from completing tasks in order to reflect on difficult topics. Eddies might also be needed for students to plan courses of action, such as creating strategies for research or dividing work among group members to successfully navigate a difficult assignment.

One way an eddy line, or the border created between the calm space behind an object in the river and the current as it moves around an object, can be seen in the classroom is when students are not committed to (or are not provided the space to commit to) reflection.

Perhaps they are still caught up in their thinking or task and need encouragement from peers or the teacher to drift into the pocket of the eddy and take a more restful, but still active, break. Students who are stressed about time, for example, may not take the reflective moments necessary to reflect on their learning and survey their path and may instead attempt to stay on the eddy line. Students who are more confident in their task may choose to play on the eddy line, pausing momentarily but not slowing down their learning processes, to either continue playing with the learning content or briefly pausing to plan their next move. The amount of time students stay in the pocket, compared to playing on the eddy line or returning to the current completely, will depend on their individual and/or group circumstances and learning goals.

Just as a kayaker must purposefully cross the eddy line to enter the calmer pocket, students need to purposefully engage and cross into a reflective space. Meaning, while reflection may happen spontaneously it is not accidental, it takes just as much care to do so as the more visible work of reading texts or answering questions. Social justice and other critical educators and researchers frequently use reflection (e.g., Pennell & Cain, 2016), and it is often highlighted in queer pedagogy (Luhmann, 1998; Winans, 2006). Reflections can occur in dialogue with others, in writing, or simply by thinking to oneself.

To reflect means thinking not only about your feelings on an issue, but also about your role or stake in that issue (Luhmann, 1998). Students in our course were questioning, for example, what it meant to be a White person when some White people were discriminating against Black people. This is an emotional process requiring internal critique and may cause students to move between their primary and secondary stability (as detailed in the previous chapter) depending on their comfort level with the topic at hand. Rather than emphasizing an unrealistic call for objectivity, using queer pedagogy allows educators to focus on these emotions, think about what they can do, and consider how they can cause us to question our thought processes and the way we interpret texts (Britzman, 2012). Allowing students time to process their emotions lets them consider, for example, how a text has significance in their own lives, and the broader world.

As our course took place, I and my fellow teacher-researchers realized that we needed to increase the intentional moments of reflection (eddies) we created for our students. In the beginning of the course, each student handout included questions that asked them what they felt about

the information they read. However, the reflective question was always placed last, and I realized that waiting until the end to reflect was not the best strategy. This was especially problematic as some groups were not getting to the last question at all, as they were spending most of their class time researching and problem-solving. As the course progressed, I added these questions earlier in student handouts, so they could pause and reflect throughout their engagement with a text.

I also phrased these reflective questions in multiple ways on a singular handout. For example, I asked students (a) are the opinions in the article different from your own? How? (b) How do you feel reading the article? and (c) What do you want readers of this article to know about the topic? These questions helped them parse out their emotions and thoughts easier than simply asking one question such as "What is your reaction?" We also engaged in reflective class and small-group discussions throughout the entire unit. This both helped the students continue to process the information, as well as highlighted for the teaching team areas where they needed help, either with the information or the overwhelming feelings that thinking about social justice may produce. Before our last unit, we also asked the students to write anonymous reflections on the class itself, so we could best plan for our final weeks together. In this way, we allowed students to reflect on their own feelings about topics, their learning, and the course structure and materials, which gave them increased ownership of the curriculum. By intentionally asking students to catch these eddies, we required them to slow down, examine their emotions and thought processes, and consider what they needed to move forward. In the following examples, I will explore moments from *Math for a Cause* where students reflected on serious issues in the eddies and also planned for future actions down the river.

5.3 Catching Eddies to Reflect on Social Justice Issues

As previously stated, one of the topics students needed to catch eddies for reflection while they worked was race. This is a difficult subject for many people, and it was especially hard for middle school students at a primarily White school who had mostly never experienced racism themselves. Students were also reflecting on their learning processes, and how their ideas about social justice and mathematics were changing throughout the course.

Student Reflections on Race

Throughout the course, students used their critical literacy and critical mathematics skills to resist racist stereotypes. While race was difficult for the students to talk about, they did have an awareness of the way the media and society portray People of Color as lesser than White people. In the first unit on Michael Brown's death, Bryan asked the students in a whole-class discussion to notice how Brown was addressed in the articles they read. One group, who read an editorial from a conservative author (Chavez, 2014), immediately identified this author as racist because she kept emphasizing Brown's large size and wrote that calling him a teen made him seem like a child when he was actually an adult (as if adulthood would justify his death). Another group said he was referred to as Mr. Brown in their article (Bosman & Fitzsimmons, 2014), which also showed him as an adult, but they were not sure if this meant the authors were racist as they could not find (or missed) other context clues to guide them. This one reflective question allowed students to consider their articles from a different perspective and increased their understanding of both their own article and the topic as it fit into social justice concepts surrounding systemic racism.

Students continued to reflect on Michael Brown's case and racism throughout the unit. Aiden, who as noted in the previous chapter on primary and secondary stability was not always focused, spoke to me one day about why Wilson (the White police officer) shot Brown multiple times. He wondered why he had to shoot at all, and did not use a Taser, baton, or another weapon that was meant to stop a suspect, rather than kill. He wondered why if Wilson felt he had to shoot Brown, he did not try shooting him in the leg to stop him from walking away. While Aiden was asking logistical questions only at this point, it was a beginning step for him to consider the implications of Wilson's actions. This was a day students had talked explicitly in class about the racist implications of Wilson shooting Brown. While it was not clear that Aiden had come to the conclusion that Wilson's actions were racist, I was glad that he was trying to work through what he had read. Aiden was on the eddy line more than fully in the pocket of the eddy and was therefore not ready to engage in deeper questions. Perhaps if Aiden was not determined to stay in his primary stability (here, it was his knowledge of guns from his time hunting with his family) he could have moved to consider the broader social implications of Wilson's actions.

Further reflections on race occurred during our second unit, when Morgan created an activity to practice calculating and comparing percentages based on data about the US prison system and the racial makeup of our prisoners. Morgan had included two reflective questions in the handout (asking "What conclusions can you make based on this math" in the middle and the end of the series of questions), and when she went over it with the class asked students to share their reflections. Students were candid when she asked for their interpretations, showing that they felt comfortable and safe in our classroom, and that this time for sharing their reflections was valuable. When Morgan asked if anyone had felt that because the numbers illustrated there are more African-Americans in US prisons than other races (African-American was the term used in the data Morgan drew from to create the handout), this meant that African-Americans were bad people, Rosette honestly replied that she wondered that at first. This let us have a discussion about how numbers can appear to mean one thing at first glance, but that we need to read them critically to understand what is really happening. Morgan asked for other thoughts, and Ally replied:

> The first thought that came to me wasn't just because they're bad people, because um it's like a really popular but bad thing that's happening in our country where Black people are [stereotyped by] racists, so instead of thinking that they're all bad I start to feel bad for them. Racist people are just putting them in jail to prove their point or something.

Other students agreed that this was a possibility: That the high proportion of Black people in jail was more about racism and less about Black peoples' actions. The students concluded, through their mathematical calculations and their reading of the numbers within a lens of social justice, that the prison system was an indication of a racist society. This realization may not have occurred without giving students the time to reflect and think through multiple possibilities. While Morgan facilitated the conversation, she posed questions that were open rather than guiding them toward a conclusion, and she never stated her own opinion about the numbers, thus engaging in queered teaching practices of open dialogue.

Teacher Reflections on Racial Discussions

Morgan and I also reflected on how students grappled with discussions on race. We had both noted that students could discuss LGBTQ+ issues

fairly easily, perhaps because the campus GSA was large and active and there were visible queer people on campus. We both reflected individually on why this ease was not present in racial discussions, and in our discussion at the end of the course we talked of this explicitly as we sat in an eddy together to hash out our thoughts and feelings about the course as a whole. As she told me in an interview, at The Anchor School discussions about race as it manifested in contemporary society were not occurring. The students were instead primarily talking about race in terms of American history. They had an extensive, and impressive, unit on the Civil Rights Movement and most of the students at The Anchor School knew more than the average student from other schools. They knew the names of prominent Freedom Riders, which is not something I am confident I could talk about easily now, and they could talk in depth about the significance of the movement. Some students had even participated in a field trip where they visited important civil rights landmarks. But as Morgan noted, "that almost feels completely different." It is easy to dismiss racism when you do not experience it; it is perhaps easier to discount it when you only discuss it in terms of the past. Morgan explained that the school's current approach "gives a context and a history to what's happening today, but the kids, they don't make that connection" to the present. This was an issue Morgan was personally interested in tackling and was one of her priorities for the coming years as she worked with other teachers to plan how social justice could be better incorporated into the curriculum.

Thus, because the students only learned about Black experiences in a historical context and were never asked to think critically about how those experiences influence people today, it makes sense that some were stuck on figuring out simply if the people in prison were "bad" or not rather than thinking about the systemic implications of racism. Morgan continued to reflect on the students' mindset, stating "When they're so not used to talking about race and so not ready we just really can't force it on them. And we were jumping right into, 'why are there more Black people in prison?' That's heavy stuff." We both thought that were we to teach this unit again, we would take a step back and discuss race and racism more generally before jumping into a specific example. This general discussion would serve as an eddy, before students jumped back into the current of learning about contemporary social justice events.

Morgan used these reflections to plan for a future class she was developing on identity. She wanted to create a new required course that would start with students exploring their own identities, including race.

She felt that after these internal reflections, students would be better prepared for external reflections on society. This scaffolding would hopefully prepare students to apply their knowledge in critical ways. From these examples, it is clear that catching an eddy for reflection is important not only for students, but for teachers. It is commonly cited as "best practice" for teachers to reflect on how their practice is affecting student learning. Here, Morgan was considering not only student learning from an academic sense, but an emotional and developmental sense as well. While teaching can be overwhelming, it is crucial that teachers find the time to reflect to lead to even larger student gains.

Student Reflections on Learning

Students were also given many opportunities to reflect on their own learning throughout the course. As seen in the example at the beginning of the chapter, sometimes this occurred when the teaching team would ask groups questions about their process while they worked. Another more systematic method was pre- and post-surveys which asked students to reflect on their experiences and feelings regarding social justice, mathematics, and how the two can work together. These end-of-semester surveys showed that students felt social justice is "really important for everyone to think about" (Mia) or that it is a problem, such as when Izzie wrote "I think social justice problems need to be fixed." Additionally, as previously mentioned, I adjusted how we asked students to reflect on their written work and provided more frequent opportunities for this reflection so that students caught eddies during their reading and mathematics activities, rather than only at the end.

The interviews conducted with focal students Mia and Sum Dood gave further and more in-depth illustrations of student reflections on learning. Mia, who in the beginning of our course said she did not like math, finished the course feeling differently:

> I guess I have liked math a little bit more. … I've learned more in [my non-elective] math class and I've incorporated it with other stuff in this class. So it's kind of more usable, or something?… I'm seeing ways it can be used in real life and not just math class and worksheets and little practice problems.

Bryan and I were happily surprised that Mia was seeing how math was valuable in her real life, a struggle for many math teachers to convey.

When math was combined with a topic she cared about, and she had learned the ways that mathematical data could be read like a text, she was more invested. This further supports the idea of critical mathematics scholars that mathematics should be used to read the world (Gutstein, 2006). Mia was just beginning this journey, and hopefully our course set her on a path for further mathematical literacy.

Students also reflected on what social justice meant to them, and how their feelings about it had changed throughout the course. Sum Dood is a poignant example, who shared with us in both interviews how his feelings had evolved. He noted in his first interview, conducted about a month after our course started, that "first I think it's important to understand why, like before you try and solve the problem, understand why that problem is there." Sum Dood was talking about investigating why opponents to same-sex marriage felt such opposition to something that, to him, was an issue that warranted complete support. By reading different viewpoints in our class, he was questioning what "old certainties made no sense" (Britzman, 2012, p. 297) in regard to both his own certainties on why supporting same-sex marriage was good, and why opponents to same-sex marriage thought it was bad. He wanted to think about why and how each side had formed their opinion, in order to discern how he could convince opponents that they should support same-sex marriage and gay rights more broadly.

Sum Dood shared in our second interview, after the class was over, that before the course he was already a part of his school's GSA and "was for gay rights and all that, but I didn't think of it as a social issue." The course gave him the language to explain how gay rights fit into the idea of social justice and helped him understand what that term meant. Because of this understanding, he could better articulate what his GSA work meant and why it mattered to him. Without reflecting on social justice as a concept, Sum Dood may not have realized that he was already participating in social justice work. Connecting it to a broader context helped him understand that gay rights are bigger than his school or local community.

5.4 Planning for Future Rapids: Using Eddies to Strategize

As was hinted at in the previous section, time for reflection taken while in eddies allows students to plan future actions. This space for reflective planning is crucial for students, as it allows them to consider multiple

solutions to a problem or task, and then pick the one they consider the best, rather than simply picking their first idea or the simplest to execute. Taking a time out in an eddy can allow for creativity and strategic thinking, which cannot occur if one is preoccupied with getting through one rapid at a time. Pausing to look ahead can make for better decision making and lead to better learning outcomes. The following examples show students taking different tactics after reflective planning, both regarding the topic of promoting same-sex marriage to an outside audience.

Convincing an Audience: Would You Give Them the Serum?

In the final unit of the course, where everyone researched same-sex marriage in celebration of it coming to our state, the "Podcast Boys" Justin Case, Sum Dood, and Sue Denim were investigating if there was a relationship between same-sex marriage laws and LGBTQ+ suicide rates. As this took place in 2014 where the legality of same-sex marriage differed from state-to-state, they searched for suicide data broken down by states. They had determined there was a slight correlation (11.05 suicides for one year in states that allowed same-sex marriage, compared to 12.94 suicides in states that did not) and were trying to figure out how to display that information in a way that would convince people they should support same-sex marriage laws. Their mathematical calculations will be discussed later in Chapter 6: Going Around Learning Obstacles: Portages, but here I will focus on their decision-making process regarding their Web site. The students were encouraged to create a final product that could portray their chosen message to an audience outside of the school, and the Podcast Boys thought that a Web site was the best way to do this.

Justin Case was determined that they should present their information in the most convincing way possible, so he asked Sue Denim to write "so now we have determined that the suicide rates of states that allow gay marriage is lower than the suicide rates of states that don't. So if you wanted to lower the suicide rate you could make all states with gay marriage." However, Sue Denim remained skeptical and resisted Justin Case's strong statement. He narrated aloud while he typed his own, more restrained, version: "We do not know if the higher suicide rates are related to gay marriage." Justin Case and Sue Denim argued, with Justin Case claiming that their Web site's purpose "is to say you should allow gay marriage because it will lower the suicide rate" and that Sue Denim's statement did not help their cause. At this point, Sum Dood chimed in

and echoed Sue Denim's skepticism, stating "I still think that this could be completely wrong." Sue Denim continued to protest, asking "what if it's a scam?" Sum Dood and Sue Denim recognized that they did not have the data to state for certain that it was the same-sex marriage laws that created the difference in suicide rates, but Justin Case was unconcerned about this lack and instead thought their message was more important than how they came to their conclusion. While they were all sitting in an eddy at this moment, this did not mean that they came to a consensus: Those in an eddy can still work and think independently of each other, and dialogue is necessary to come up with a plan for the group to navigate the rapids ahead.

In an attempt to make his point of the urgency of the issue, Justin Case offered a metaphorical example. He said to his groupmates, imagine "you have a serum that might kill somebody or it might save them. What do you do, would you give them the serum?" Sue Denim immediately replied in the affirmative, but Sum Dood remained skeptical asking, "Well are they dying? If they're dying I would give it to them." Justin Case got confused about his own metaphor, replying that "They're not dying" but the serum might kill them or have no effect. Sue Denim pointed out that it was an "awful analogy" and Sum Dood agreed, adding that "If they were dying sure I'd give it to them, because they might live." The boys kept arguing about how they should write their results on the Web site, and in the end Justin Case won and they included under their bar graph a definitive concluding statement:

> So this means that if a state allows gay marriage the suicide rates go down by almost two! So if you vote against a law that would make gay marriage illegal you would in essence be saving two people per 100,000 people. (which ends up being 6260)

This reflective dialogue allowed each boy to state his point and offer evidence to support it. This conversation further allowed the boys to reflect on their feelings about how information is displayed, how information can be manipulated (at worst) or structured (at best) to emphasize a point, and what language is necessary to get an argument across. Sum Dood and Sue Denim expressed uncertainty about making such a bold statement and felt that it was dishonest, especially evident when Sue Denim used words like "scam." Justin Case also knew that it was not completely honest, but he felt that was less important than making

a strong message. As he tried to articulate in his fumbled analogy about the serum, if a message may save lives then he felt it was more important to make a strong statement even if it might not be true. According to Justin Case, convincing all the states to vote for gay marriage was the "serum" needed to prevent further LGBTQ+ suicides. Since LGBTQ+ rights were important to Sum Dood, this likely factored into the decision to leave a conclusive statement on the Web site despite their lack of evidence. Sum Dood agreed in their conversation that risking taking a serum was worth it if people might live, and in this case, those were the actual stakes they were discussing. While I hope that the boys will not continue to think that misrepresenting data is the best strategy to convince an audience (especially as this brings to mind more recent concepts of "fake news"), I was at least glad that they had a dialogue about it, weighed their options, and thought through the issues together.

Capturing an Audience's Attention: Let It Go!

Another example of catching an eddy to plan strategies in regard to persuading an outside audience during the final unit was when Aiden and Jimmy Smith discussed how their video could convince people in other states to vote for same-sex marriage. While the pair were walking outside from the middle school building to the library, they discussed their strategy (and happily for my purposes, left their audio recorder running). They debated how they could capture an audience's attention and Aiden playfully suggested they sing. Jimmy Smith immediately began loudly singing "32 states, have legalized gay marriage! Gay marriage!" to his own tune. Aiden decided it needed to "sound catchy" and Jimmy Smith agreed they needed a "catch theme song." Aiden promptly thought of *Frozen* (Scribner Lasseter, Buck, & Lee, 2013), the animated Disney movie that was wildly popular at the time. I have somehow managed to avoid seeing it myself, but even I can sing the chorus from the most popular song, *Let it Go* (Anderson-Lopez & Lopez, 2013). The boys both sang those lines together—"Let it go! Let it go!"—with Jimmy Smith adding "Gay marriage is OK!" as the following line. They laughed, with Jimmy Smith continuing his solo by adding "Let it go! Let it go! Let the law pass in all of the states!" While this song did not end up in their video, this reflective planning demonstrates that they were thinking deeply about how to engage an audience and what methods would be the most effective. Addressing an authentic audience is a common goal

of English Language Arts teachers, and here the students were meeting this goal in creative ways.

This example, and the serum one above, illustrates how reflection in eddies can be playful. By allowing students to rest they may get silly, but this silliness does not necessarily mean they are not engaging with the material. This silliness also contrasts with the stubborn resistance exhibited by Sue Denim in Chapter 2: Sue Denim was not playfully engaging with his chosen topic of sea turtles, and therefore was not learning anything new in the process. In the instance of using *Let it Go* as an influence, it would have been easy for a teacher who overhead Jimmy Smith and Aiden's performance to reprimand them about staying on task, especially if they only heard their boisterous singing and missed the larger discussion of how it fit into their video concept. However, given the relatively relaxed atmosphere of The Anchor School, and our lack of rigid structures in the classroom, the students were able to explore this silly side of a serious topic on their own. Allowing students the freedom to do something as simple as walk to the library while talking together, rather than moving in silence as required in some school environments, led to continued engagement with the material while they collectively rested in the pocket of the eddy. While the teaching team did not create this reflection by asking students questions, our classroom and the school's environment allowed their reflective strategizing to flourish here.

This playfulness thus became a part of their learning. It is perhaps also important for students to find moments of fun while talking about social justice, as those topics can take an emotional toll on students. The skill of reflectively playing with their ideas and planning for their future actions will serve them well if they engage in future social justice work. It is unrealistic, and likely unhealthy, to try to stay serious continuously. No one can continue social justice work if they do not take the time to catch eddies on occasion.

5.5 Benefits of Catching Eddies

As is seen from these examples, reflection can be serious or playful when catching eddies. There are many ways students reflect in an eddy: by individually thinking, through dialogue and debate with other students, in teacher-facilitated dialogue, by writing about a topic, and even by playing with the material by using their imagination and creativity.

Teachers can help students reflect not only by asking guiding questions, but by encouraging students to move away from the eddy line and fully into a more restful space. As a reminder, this rest does not mean students are not moving: They must move their paddles (their learning tools) to keep their kayak (learning mindset) safely in the pocket. This way, they can turn their tools to reflection and strategy, allowing them to look ahead rather than simply trying to get through immediate tasks that they may find overwhelming.

Teachers also benefit from eddies as they can allow them to both survey their students' current learning and plan ahead for future lessons. I am sure many teachers, especially those new to the profession or even experienced teachers executing new material, can at times feel like they are drowning in the rapids of the day-to-day tasks that are a necessary part of the job. However, catching an eddy is vital to stay afloat. Eddies may be caught for short moments of rest, occurring during planning periods or even during class as teachers think through their decision making in the moment by playing on an eddy line while they rethink how they are structuring a lesson. Longer time spent in eddies, during professional development or professional learning communities with colleagues, can allow for longer-range planning and leave teachers feeling refreshed and better able to serve their students.

It should be noted that like curriculum and classroom environments, no two rivers are identical. Thus, catching eddies may take different amounts of effort depending on the circumstances. In a faster river, eddies are rarely calm, and the slowed eddy current may still push a kayaker out across the eddy line unless the kayaker is paying close attention. In this case, the kayaker must use their paddle and shift their body weight more intentionally to stay in the pocket. In a faster-paced course, then, students will need to remain vigilant when engaging in reflection. As previously discussed, the boat (and the learner) are always in motion. They must use their tools (whether that is dialogue or individual journaling, for example) to stay in a reflective moment and not quickly get pushed back into the current, and thus in engaging in their next steps, before they are ready. This may cause students more distress, and the need for a new strategy may emerge. Thus, if students are having difficulty staying in the pocket of the eddy without tiring themselves and need more of a break, they may choose to portage and temporarily get out of the boat and river entirely, as will be discussed in the next chapter.

References

Anderson-Lopez, K., & Lopez, R. (2013). Let it go [Recorded by Idina Menzel]. On *Frozen Soundtrack*. Walt Disney Records.

Bosman, J., & Fitzsimmons, E. G. (2014, August 10). Grief and protests follow shooting of a teenager. *The New York Times*. Retrieved from https://www.nytimes.com/2014/08/11/us/police-say-mike-brown-was-killed-after-struggle-for-gun.html.

Britzman, D. (2012). Queer pedagogy and its strange techniques. In E. Meiners & T. Quinn (Eds.), *Sexualities in education: A reader* (pp. 292–308). New York, NY: Peter Lang.

Chavez, L. (2014, August 23). Eric the arsonist: Holder fans Ferguson flames. *New York Post*. Retrieved from https://nypost.com/2014/08/23/eric-the-arsonist-holder-fans-ferguson-flames/.

Gutstein, E. (2006). *Reading and writing the world with mathematics: Toward a pedagogy for social justice*. Abingdon: Taylor & Francis.

Lee, J. (2014, August 15). Exactly how often do police shoot unarmed black men? *Mother Jones*. Retrieved from https://www.motherjones.com/politics/2014/08/police-shootings-michael-brown-ferguson-black-men/.

Luhmann, S. (1998). Queering/querying pedagogy? Or, pedagogy is a pretty queer thing. In W. F. Pinar (Ed.), *Queer theory in education* (pp. 141–156). Mahwah, NJ: Lawrence Erlbaum Associates.

Pennell, S., & Cain, J. M. (2016). Adorned: Moving from decoration to disposition in social justice. In J. Diem (Ed.), *The social and cultural foundations of education: A reader* (pp. 148–165). San Diego, CA: Cognella Academic Publishing.

Scribner, A., & Lasseter, J. (Producers), Buck, C., & Lee, J. (Directors). (2013). *Frozen* [Animated Picture]. Walt Disney Studios.

Winans, A. E. (2006). Queering pedagogy in the English classroom: Engaging with the places where thinking stops. *Pedagogy: Critical Approaches to Teaching Literature, Language, Composition, and Culture*, *6*(1), 103–122.

CHAPTER 6

Going Around Learning Obstacles: Portages

Ashley, Sum Dood, and Justin Case chose to research same-sex marriage during the second unit and found an article about it from *The Week* (Gobry, 2014), a liberal-leaning online news source. From listening to their conversations as they read the article, it became clear that the text was just above their reading level and contained vocabulary that they did not understand. They were having a difficult time deciphering it and figuring out what the author was reporting as the opinions of others versus what beliefs the author held personally, which was consequently hindering their critical reading of the text. While the article was detailing why some conservative, fundamentalist Christians oppose same-sex marriage, the author himself was not arguing that their claims were legitimate. Ashley read one of their handout's questions aloud, "The question is, who has the power?" to elicit her groupmates' responses. Justin Case replied "Christians have the power in this article because they have influence over the author to write this article. They're getting attention, which is what they want. Obviously." While his insight that the Christians were the ones who had power in the situation described by the author was on track, he mistakenly thought this meant that they also had power over the author and somehow influenced him to write about their cause. Again, he and the rest of the group missed that the article was actually providing the opposite viewpoint and supported same-sex marriage.

S. M. Pennell, *Queering Critical Literacy and Numeracy for Social Justice*, Queer Studies and Education,
https://doi.org/10.1007/978-3-030-11584-5_6

Justin Case, and his groupmates, could not see that the author was reporting his insight about a predominant point of view rather than falling prey to that viewpoint and sharing it in the form of anti-same-sex marriage propaganda. In this case, the rapids were too difficult for them to successfully maneuver their kayaks through. Rather than seeing the big picture and being able to navigate the river accordingly, they were working so hard to keep themselves afloat and pointed in the right direction that they were not noticing the subtle details and how the water flowed to create a current. They only saw the individual rapids of the overly difficult language in their article.

Morgan and I checked on this group together and helped them talk through their issues. When Morgan said to them, "Tell me about this article," Ashley replied, "It was terrible!" Sum Dood echoed her, saying "Yeah, it actually wasn't a very good article." When asked, the students explained that it was not informative and "it didn't give us any information we didn't know." Morgan asked, "what beliefs came across?" to further inquire into their textual understanding, but Sum Dood replied, "We didn't really find any beliefs." Ashley also explained that she "didn't read all of it because it had all these complicated words that I didn't know." It was evident to us that this text was not working for this group, and Morgan suggested that they may need to find another one. I reiterated this, reminding them that they did not have to stick with something if it was not working for them. This made Sum Dood reflect on their process, and he responded, "I actually think that's why it took us so long to do it, because it just wasn't really something we understood, so we had trouble actually paying attention and not just doing random stuff." Here, Morgan and I provided them an eddy for reflection, and they were able to use that to reflect on their reading processes. This showed them, and us, that they needed to make a bigger change and find a new article, rather than continuing to push through something that was beyond their secondary stability and risked tipping over their kayaks completely in their frustration and confusion. Instead of staying in the river, they needed to portage: exit the river temporarily and move around the obstacle that was preventing them from continuing their journey.

After Morgan gave the students a pep talk about finding an article that got them "fired up" about their topic, the group somewhat begrudgingly agreed to find another article. In this way, they portaged around the obstruction of an overly difficult text and continued downstream with a new one. They found an article from a conservative

Christian group about why they thought gay marriage was wrong (TFP Student Action, 2015[1]) and were able to discern the power structures inherent in the text as well as the beliefs of the article. The topic was the same, but with a text that discussed an anti-same-sex marriage point of view from an author who shared that view, and a text that was appropriate for their level of vocabulary knowledge, they were able to keep paddling as a group. There was no need for them to continue working through a text that was blocking their thinking and forcing them to remain static and work against their learning mindset, and therefore disrupting their learning. Portaging allowed them to continue down the river with renewed focus and excitement, and they completed a new handout with enthusiasm. This was seen from their use of exclamation points and a large "YES!" and "We believe in and support gay marriage (unlike the haters)" when answering the question "Are the opinions in the article different from your own? How?" This was in direct opposition to their lackluster and confused response to the same question regarding their first article: "It does not say his opinion." Thus, in this case, portaging and finding a new article to analyze renewed not only their enthusiasm and confidence, but allowed them to successfully complete our critical literacy goals.

6.1 Portaging on a River

When kayaking on a river, sometimes there are physical obstacles that are too large or dangerous to paddle around. When this happens, it is necessary to portage the boat, meaning to carry it on land around the obstacle. Portaging may be necessary when there is a large tree that crosses the river completely. It may also be wise to portage around a cluster of debris in the water, especially if you cannot easily see the debris below the surface and so may miss branches that could scrape the bottom of the boat and make paddling around the obstruction dangerous. Another related reason for carrying the boat is when the water levels are too low to allow the kayak to float. Yet another is to avoid dangerous rapids or waterfalls that are above the skill level of the paddler. Whatever the reason, kayakers sometimes need to paddle to the banks of the river and carry their boat downstream until it is safe to reenter the water (Fig. 6.1).

This can apply to students and learning in a number of situations. Sometimes, students may feel stuck and need to temporarily exit a

Fig. 6.1 Kayakers encounter trees obstructing a river

learning situation so that they can continue at another point in the process. This may occur when students are challenged past the point of acceptable discomfort and are unable to proceed, such as when a task exceeds their current ability. Most teachers have seen students mentally shut down during a difficult lesson, and working with them individually is necessary to assess, and help them to assess, their needs. As trying to stay static in a learning situation is counterproductive, a teacher's guidance is crucial to help the students go around the obstacle and get back on course with a task that is more suitable to their ability level. This does not mean that students should be unchallenged, but there are situations when a challenge is (perhaps temporarily) insurmountable. For example, there may be times in classes such as a chemistry lab when students are not sure of which chemicals to mix for an experiment and need teacher guidance to prevent disaster. In an English classroom, there are situations as described above where the vocabulary is beyond

students' reach and causes them to misunderstand the text. Lastly, there may be times when mental and emotional resources run dry, like a shallow river, and students need to portage to regroup. Stopping for a longer period on the riverbanks to refuel themselves before carrying their boat downstream can help students stay engaged in the curriculum for the long term.

In these situations, it is important that teachers and other students do not shame the one portaging; everyone has their limits, and it is better to recognize and go around them that get stuck or put yourself in a dangerous situation. Portaging does not mean abandoning your learning entirely, it instead means that you will reenter the learning activity at a point more suited to your current abilities and mental state. Carrying your kayak (your learning mindset) and gear (your learning tools) out of the water takes work just as paddling does, and this work is also essential to learning. Students will need to have self-confidence in portaging just as they do in other learning activities, and teacher and peer support can assist them in knowing when to portage and where and how to reenter the river.

This support for portaging does not mean, however, that students should always portage when they think the learning material is challenging. Portages should not be used simply to get out of a learning task a student does not feel like completing, or to allow them to remove themselves from challenging conversations outside of their comfort zones. It would not be appropriate or helpful to allow a White student, for example, to leave the room during a discussion of White privilege rather than encouraging them to work through their potential discomfort as they question their own identity and privileges. It is merely one strategy that is useful when students are at a point where they cannot work through a problem with their current skill set and asking them to continue would not be helpful. This is a judgment call that can be tricky for any teacher, but in general portages should not be used all the time or students may use it as an excuse to avoid hard work or so-called controversial topics. Furthermore, students who must constantly portage will tire from carrying their gear on land rather than using their other learning tools to paddle through difficult—but safely manageable—rapids. Portaging should be used in combination with other strategies discussed in this book, such as encouraging students to be in their secondary stability, to help them learn how to navigate their learning in multiple ways.

6.2 Portages in a Queered Classroom

Schools are normative spaces that house many unconscious rituals and boundaries in which teachers and students must work within (McLaren, 1999). While proponents of queer pedagogy and theory encourage us to stretch or remove boundaries and limits, there will be times in educational settings when we are faced with a hard boundary, which can cause distress for those wishing to queer their pedagogy (DePalma, 2010; Whitlock, 2010). These might include district-mandated testing dates, report card due dates, or simply a student whose stubbornness and will is stronger than the best lesson plans and enthusiasm for teaching we can muster in the moment. But rather than seeing these boundaries as a definitive, permanent blockage, queer pedagogy allows us to focus instead on moving around these boundaries. This does not ignore the boundaries' existence, it merely highlights the flexibility of curriculum. When teachers are already rethinking boundaries in a queered classroom it may be easier for them to also consider how to transgress unavoidable limits.

In our classroom, portages were used in small group situations like the one with Ashley, Justin Case, and Sum Dood described above; by individual students working around their own mental boundaries; and by the whole class (teaching team included) when we realized our navigation downstream needed some adjustment. Below, I will share examples that show the necessity of sometimes going around limitations rather than trying to fight through the rapids.

6.3 Portaging as Classroom Management: A Cautionary Tale

On occasion, the teaching team tried to use a portage to get wayward students back on track. Or at least, the track we wanted them to be on. In this way, we were unconsciously attempting to reinforce the boundary of teacher as the authority figure, a boundary we were trying to reduce in most of our classroom situations. During the second unit, Sue Denim and Aiden left the river path the other students were on (researching social justice topics of their choice and creating their own math problems) and were instead going down another stream and using the situation to write about what they already knew about turtles (as discussed in Chapter 4). They were immobile in their learning and had stopped the motion of their kayak.

In an attempt to move them forward and around this mental block, we asked them to portage by giving them an activity from Gutstein and Peterson's book *Rethinking Mathematics* (2005) where they had to look at the federal and state minimum wages and use them to calculate income when taking average living expenses into account, such as rent and grocery costs. This did interest Sue Denim, though he was using things like Yahoo answers and similar sources, and thus searching for stories on this topic that had charts and calculations already included about this information. He chose this instead of conducting his own research on housing and other costs, and then conducting mathematical calculations based on working full time on minimum wage, as I asked of him. These choices of his were made despite me having discussed with him how to identify proper sources, and how to search for them, several times. For Sue Denim, conducting that research as not necessary as he knew how to find the complete answer on his own, making the research and mathematical calculations (and my attempts to get him to follow my directions) pointless. So, while Sue Denim did find answers to the problems, with Aiden sometimes helping but mostly continuing to search for unrelated things on the Internet, the activity did not motivate him to conduct his own research to solve problems linking the environmental issues that interested him to social justice as we had hoped. As Bryan pointed out when we discussed his behavior, Sue Denim was a master of passive resistance. When we checked on him, he would type extra loudly and keep his head toward the laptop screen, always keeping his back toward us. His work on the *Rethinking Mathematics* (Gutstein & Peterson, 2005) activity was another kind of passive resistance: Completing the work in the simplest way, rather than the way we were trying to teach him. Really, he was being more efficient than what we were asking for, which may have been a reason he ignored our directions.

In this situation, portaging did not work. Sue Denim reentered the river but did not mentally move beyond the obstruction (his unwillingness to conduct research), as he did not see his mindset as an obstruction. To Sue Denim, the teaching team was the obstruction keeping him from focusing on what he wanted (things he already understood and knew many facts about, like sea turtles). He did not see a point for engaging in inquiry, as he felt he knew enough about his topic already. While this activity did keep him occupied and prevented us from having to constantly check that he was working as expected, Sue Denim was not learning and growing. In his case, we struggled to find a way to get him

to catch an eddy for a moment of reflection, and he was not open to our suggestions for ways to make his project fit the class parameters. Sue Denim perhaps instead would have been better suited to taking a different river and being given more freedom to explore, perhaps with more texts chosen by the teaching team on his favorite topics that may have eventually gotten him to move out of his primary stability on his own and take more calculated risks with his learning. However, the teaching team was not able to portage around our own obstructions of what we wanted the river to look like: A normative vision of every student moving forward at relatively the same pace on the same river. I was not able to queer my own pedagogy enough to create a learning experience for Sue Denim and Aiden. Though I did not realize it at the time, I was using the portage as a way to avoid having to think more critically about my curriculum and delivery of instruction.

6.4 Ally Portages Around a Mental Obstruction

Despite Sue Denim's passive resistance, there were students who portaged in productive ways that enhanced their learning. Ally, a seventh grader and one of our focal students, is a great example. She took the class because she loved math, especially because (as she shared in her initial interview) she saw it as a set of logical rules she could use to solve problems and find a singular, correct answer every time. This love of rigid structures seemed to counter the typical mindset promoted by The Anchor School staff and teaching philosophy, which allowed students much more flexibility than the public schools with which Bryan and I were most familiar. Students had a lot of physical independence, for example, and could walk the school grounds on their own rather than being constantly monitored by a teacher or needing to carry a hall pass that gets time stamped when they complete their errand. Because of her more rigid mindset, Ally's learning seemed stuck, and Bryan and I did not expect for her to make the large conceptual gains that we were seeing in some of her classmates. In listening to her conversations on the audio recordings, I had not noticed her budging from her boxed-in ideas about the world. However, when we interviewed her at the end of the course, we were pleasantly surprised by some of the leaps she had made.

Bryan asked Ally questions about math, specifically what kind of skills she thought were necessary to do the kind of work we were expecting

in class. Ally responded by talking about percentages and averages, which was not surprising as that is what the majority of students were using in their calculations. However, her thinking about how averages and percentages worked had shifted to go beyond her own mental block of viewing numbers as static and finite. As she discussed her group's investigation into the connections between school funding and student achievement during the second unit, she said that "It wasn't like actual numbers, it was just the average." When asked to elaborate, she created an impromptu mathematical situation, saying

> Well let's just say—I'm making this up—in one school there are five kids who are 14, two kids who are three, and four kids who are nine. If it says the average is, something way different or something, the average may not be what it seems, there might be older people. I'm making this up cause I'm not doing the math- the average is like five, what about the 14-year olds? It doesn't say it there. There's more to the average.

Ally had previously thought of an average as an absolute truth that fully described a situation, and this mindset hindered her in some class conversations where we discussed how numbers could have multiple interpretations. Ally continued her explanation in her interview of this new discovery by stating that on a Web site that reported polling data "some of the averages were different from other averages for the same thing. Like, on one website, the average would be higher and on another site the average would be lower or something like that, it was really weird." She was referring to polling data percentages we had asked students investigate when they were researching public opinions on same-sex marriage and other LGBTQ+ topics during the final unit.

For the whole-class activity Ally was referring to, we asked students to notice the subtle differences in percentages of people "for" or "against" when questions used different wording. For example, poll questions asking about "homosexual marriage" compared to "same-sex marriage" had different results, with same-sex marriage getting more favorable responses. This activity served as a portage, as it took place while students were already working in small groups. We pulled them out of the river temporarily, allowed them to tune up their learning tools and paddling skills, and then reenter the water past the obstruction (in this case, reviewing how to compare percentages and research social justice concepts using opinion polls).

By seeing how the numbers were not the same even though the questions were about the same topic, Ally saw how critical literacy and critical mathematics worked together and it opened her worldview. She began asking herself questions such as, "are they lying, or are they giving their opinion of the average?" In Ally's case, being presented with information that allowed for comparisons (in this case, comparing percentages and averages related to opinion polls) demonstrated for her that small differences in numbers may indicate bigger differences in how the numbers were calculated in the first place. These calculations were not something she had previously questioned, as for her mathematical calculations were absolute truths. This questioning was a big step for her, and an important one in her mental development. It allowed her to portage around her fixed idea of math as truth and continue downstream with her eyes more open to new visions of the river, and the broader world. While she did not go so far in her thinking as to question the validity of numbers or mathematics themselves, in rethinking how mathematics worked she was able to continue paddling downstream with a new curiosity that is necessary to any learning environment. Though I do not know if this broadened mindset stretched to other areas of her life, I hope that it allowed her to see the world more flexibly, particularly the complex social justice topics with which we were engaged in class.

6.5 Shallow Waters: A Whole-Class Portage

In October, after the second unit when our class was past the halfway mark, the teaching team realized that some of our students were feeling overwhelmed. Students commented on the seriousness of racism, for example, and wondered what could be done about these issues in tones that seemed despairing. A parent had also reached out to Morgan on open house night and expressed concern about the heaviness of the topics: not because the parent did not think their child should be learning about social justice issues, but because they were worried about the emotionality of the course. The teaching team talked together after class one day (catching an eddy to reflect) and wondered if the social justice topics were too heavy for the students because of their age (10–13), or if they were having problems understanding the issues as most of them were so far removed from them due to their own privileged experiences. This is not something we could easily answer, and in hindsight I wonder if consulting with a school counselor would have been helpful to gauge what

further support the students needed to work through the emotional turmoil that often accompanies thinking through social justice topics.

Bryan noted during this group reflection that we had been focusing mostly on negative numbers—such as the disproportionate percentages of People of Color compared to White people in prison—and wondered if we could end the class by reading about a positive social change instead, and then using math to track that change. We all discussed how we did not want the students to end the course completely discouraged, as is a fear of many social justice educators. If students are left in a place of darkness, they may not be able to see that the movement toward justice is worth the struggle. We were also worried that perhaps their lack of experience with strife was causing them to spend of a lot of energy trying to understand the depths of the problems we discussed (such as racism and transphobia) and this focus on *what* was happening to marginalized groups rather than *how* or *why* it was happening made it difficult for them to see the issues as systemic. While later some of these fears would be assuaged through taking a deeper look at student conversations and interviewing students after the course was over, at this moment our own mental reserves were also getting shallow. It was time for a break.

To help us get around this situation, we pulled out of the shallow water and away from the obstruction of negativity onto shore to check how our students, and their gear, were faring. We created a simple three-question survey about the course asking students what was working for them, what was not, and any suggestions they had. We were hoping to use their ideas for a final project that would allow them to demonstrate their learning in a meaningful way. As with many such surveys, there were conflicting responses: Some liked the research while others did not, some liked the freedom to create their own math problems and others wanted more structure. There were, however, some common themes in their suggestions. Many students were excited about marriage equality as it had recently come to our state, and other students were interested in working with the school's environmental club. Many students also wanted to complete a service project off campus.

We stayed on shore longer, brainstorming about feasible projects we could do with students, and looking in to the possibilities for a trip off campus that would keep with our goal of social justice with lasting impact on the community and students (such as addressing food inequities on a systemic level by working for sustainable sources and equitable access) rather than being a service project that only creates a

temporary solution (such as volunteering for a few days at a food bank, without working toward more long-term fixes for food insecurity). Unfortunately, when we looked at the calendar we realized that with only a few weeks left of the class we needed to keep our expectations realistic, and that we would not have time to leave our current river to join another group on a social justice journey elsewhere. As with many teaching situations, timing and resources limited our options.

When we spoke to the whole class about it, Morgan explained that we took their feedback to heart but that we simply did not have time to plan an off-campus trip. The students were understanding, and when we said we had decided that everyone would focus on marriage equality for the final project as it had the most interest and was current, they were excited. This gave them the more positive ending we were looking for, and we hoped this would leave them feeling less bogged down by the heaviness of our course topics. By focusing on a social justice issue that was receiving positive attention concurrently, students were able to refocus their energies and investigate how numbers could demonstrate this changing river current that was being navigated by an increasing number of kayakers.

This mental break was needed by all of us. If we had attempted to keep pushing through the obstacle, or just catch an eddy without getting out of the water, we would not have gotten the longer break that we needed to reassess our direction with fresh eyes. By portaging around the negativity and taking the time to rebuild our shallow mental resources, we were able to keep moving downstream before we had exhausted ourselves to the point of wanting to give up completely. Because of this break, students began working with new energy and excitedly discussed ways that they could share a message of the need for legalizing same-sex marriage with a broader audience beyond The Anchor School. Some of this first group conversation included silly but enthusiastic ideas, such as attacking resistant government officials with silly string and glitter or making a banner to attach at the end of low-flying airplanes, as was used by advertisers at the beaches a few hours away from our community. With some prompting from the teaching team, the students decided to make videos or Web sites. Sue Denim wanted to make a Web site, and this was one of the few times Sue Denim expressed interest in the class, showing that giving him more choice was (at least in this case) a positive way to increase his motivation. Thus, portaging helped both the teachers and students, even those with the most resistant mindsets, to continue down the river and explore new possibilities for learning.

6.6 Knowing When to Portage

As these examples show, portaging in the classroom can help student learning in a variety of challenging circumstances. The least useful implementation of portaging is as a form of classroom management: while getting a student to portage around an obstacle of their own making (like a lack of attention to their work) can occupy them enough to free the teacher to help other students, it does not actually help the portaging student learn. This is akin to using writing or other instructional tasks as punishment: rather than reinforcing the goals of the lesson it just serves as busy work to enforce behavioral compliance. As with most classroom situations, unless a student has intrinsic motivation, they are unlikely to benefit from their classwork or the teacher's instruction. However, when students such as Ally come to recognize their own mental obstruction, they can see the need to go around these blockages to gain new understandings. Once Ally moved from her rigid mindset of mathematics and numbers as inarguable truths, she was able to question her ideas and see how mathematics are actually open to interpretation, and how calculations could vary depending on the circumstances under which the data was collected.

For our teaching team, we learned that sometimes reflecting in an eddy was not sufficient and to truly preserve our energy we needed to temporarily get completely out of the water. While it can seem like too much work to carry your gear to shore and around an object, it can ultimately save energy in the long run. By pausing on shore long enough to take an inventory of student mindsets and tools (their kayaks and accompanying gear), we too had a mental break and could see the entire picture of their learning, rather than their mental block of negativity in the moment. Teachers can be reluctant to stop as it feels there is never enough time in the classroom, but in our case this pause and longer moments of joint reflection and dialogue were necessary and allowed us to start again with a new, brighter focus that took us through the end of the course.

Note

1. The students read this article in 2014, but it was updated in 2015 (as cited) to include a note that "In writing this statement, we have no intention to defame or disparage anyone. We are not moved by personal

hatred…our only intent is the defense of traditional marriage…and the precious remnants of Christian civilization." This implies there was enough pushback on this article that the group was moved to respond, but they were not moved so much that they reconsidered their stance.

References

DePalma, R. (2010). The no outsiders project: In search of queer primary pedagogies. *Transformations: The Journal of Inclusive Scholarship & Pedagogy, 21*(2), 47–58.

Gobry, P.-E. (2014, September 3). Why so many Christians won't back down on gay marriage. *The Week*. Retrieved from http://theweek.com/articles/444138/why-many-christians-wont-back-down-gay-marriage.

Gutstein, E., & Peterson, B. (Eds.). (2005). *Rethinking mathematics: Teaching social justice by the numbers*. Milwaukee, WI: Rethinking Schools.

McLaren, P. (1999). *Schooling as a ritual performance: Toward a political economy of educational symbols and gestures*. Lanham, MD: Rowman & Littlefield.

TFP Student Action. (2015, February 5). 10 reasons why homosexual "marriage" is harmful and must be opposed. Retrieved from https://www.tfpstudentaction.org/blog/10-reasons-why-homosexual-marriage-is-harmful-and-must-be-opposed.

Whitlock, R. (2010). Getting queer: Teacher education, gender studies, and the cross-disciplinary quest for queer pedagogies. *Issues in Teacher Education, 19*(2), 81–104.

CHAPTER 7

Moving Forward When Faced with Learning Difficulties: Rolling a Kayak

The "Podcast Boys"—Sum Dood, Justin Case, and Sue Denim—were working on a Web site to promote same-sex marriage during our third and final unit in *Math for a Cause*. They had decided their math problem would be figuring out if there was a correlation between suicide rates and same-sex marriage laws per state. While Sue Denim was lying under the table trying to convince his group mates to put a turtle on the Web site, Justin Case and Sum Dood were conducting research and trying to figure out which mathematical calculations worked best for their idea, using Sum Dood's "calculator of justice." Bryan checked on them early in the period and asked about their plan. Justin Case explained to him, "We looked up suicide rates of every state, and then we found which states allowed gay marriage and which states don't, and then we averaged out the number. We're adding the suicide rates of the states that don't allow gay marriage together and then dividing by how many states there are that don't allow gay marriage." The boys felt this simple averaging would allow them to see if there was a difference between the states that did allow legal gay marriage compared to those who did not. Bryan told them their idea was a good one. However, he was not convinced their methods would give them the answers they sought. Like many student groups had done throughout the semester, the Podcast Boys likely started calculating averages because it was the skill with which they were most familiar. Bryan chatted with them a little longer and encouraged them to keep working.

S. M. Pennell, *Queering Critical Literacy and Numeracy for Social Justice*, Queer Studies and Education,
https://doi.org/10.1007/978-3-030-11584-5_7

As the Podcast Boys were finishing and deciding how to display their data on the Web site, Sum Dood declared, "Wait a second, do you know when this data was collected, this North Carolina suicide thing? Cause North Carolina just got gay marriage." He began looking at the Web site they used for suicide rates and realized their calculations were incorrect. Bryan and I came in at this point, and Sum Dood shared with us, "We just found a problem. We were basing our numbers on what states allow gay marriage right now, in 2014. But some states did not have it in 2011 when these suicide rates are from." I confirmed Sum Dood's suspicions and explained that many states only got same-sex marriage a few weeks ago due to a circuit court ruling, so they would need to find an earlier list of which states had same-sex marriage in 2011.

I helped them navigate through the information on a Web site they found that listed when different states got same-sex marriage as well as Civil Unions, a legal recognition of a relationship that some states or cities had which offered couples some of the same rights as a legal marriage. Here, they needed guidance with both dissecting the terminology and their digital literacy practices. With digital literacy, it is important that students learn how to decide what sources are reliable and relevant (Rhodes & Robnalt, 2009). Digital literacy also relates to queer pedagogy as reading online is not typically a linear task, as users can instantly click a hyperlink and begin investigating a new text instantly, which is not something easily replicated with print text. As Rhodes and Robnalt (2009) pointed out, this causes students to "construct their own unique text… [in which there] can be many paths…where each reading may result in different information or the reader may come to a different understanding or conclusion" (p. 162). With the addition of the Podcast Boys' mathematical calculations adding another layer of meaning, this resulted in their initial confusion and miscalculations of the suicide rates' relevance to same-sex marriage laws.

The students further needed assistance with critical literacy, mainly in figuring out what the power relations were between Civil Unions and marriages. The boys decided to only use same-sex marriage laws to keep their mathematical calculations simpler. Even still there were complications, as they had to decide if a state getting same-sex marriage in July of 2011 was early enough for their correlation with suicide rates. Ultimately, they decided that did not count, and only used states who had same-sex marriage in all of 2011 for the positive category; all other states were in the category of not having same-sex marriage. From here, they redid their calculations, and Justin Case commented that "we're going to send the

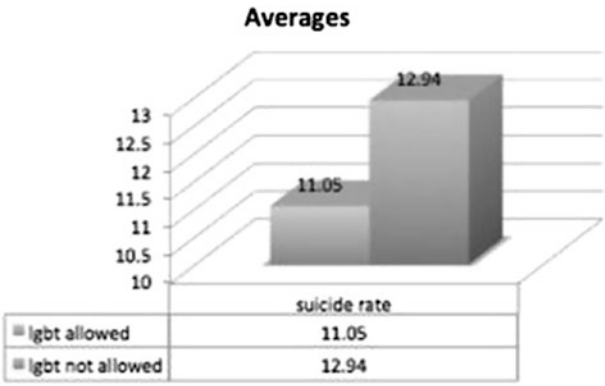

Fig. 7.1 Bar graph from the Podcast Boys' Web site

website back to alpha because the data was in 2011 and we didn't account for that." The possibility of reaching an outside audience seemed to motivate them to double-check their calculations. This authentic audience is something writing teachers often want their students to work toward, and here, it proved fruitful for their literacy and mathematics skills.

The Podcast Boys did find a slight correlation—states that had same-sex marriage had a suicide rate of 11.05%, while states that did not had a suicide rate of 12.94%—which they exaggerated in a bar graph to look visually persuasive (shown in Fig. 7.1). Justin Case wanted their Web site to send a strong message that same-sex marriage laws decreased suicide rates, as discussed in Chapter 5. They were so proud of themselves and their discovery that they included in their Web site credits that Sum Dood was the "fatal flaw figurer outer." Rather than being stymied when they were thrown momentarily off course by a misreading of information that resulted in their miscalculation, they were able to successfully stay on track and complete their project. This relates to rolling in kayaking, which is explained below.

7.1 Learning to Roll

A kayak rolls when it flips over, tipping the kayaker upside down and into the water. This can happen in strong rapids or when a kayaker leans over too far, going beyond a manageable secondary stability (meaning

when a kayaker leans over so the boat is on its edge; explained further in Chapter 4) or angled posture. Unlike in a canoe where a paddler will fall out of the boat when tipped over, a kayaker is often attached to their boat. Kayakers, especially those in white water (rivers with heavy rapids) wear a spray skirt, an item made of a stretchy waterproof material worn around the waist where the hem of the skirt attaches over the lip of the kayak opening (called the cockpit coaming) where the paddler sits. The skirt surrounds the kayaker's waist on all sides this way, sealing them into the boat. As kayaks sit low in the water, without a skirt water would come into the boat when paddling through rapids. In our metaphor, a mental tool (the skirt) keeps a student attached and within their learning mindset (the kayak) even in times of difficulty.

If a kayaker is in rough water or panics when they turn over and cannot successfully roll back up (a technique which is explained in the following paragraph), they can pull the skirt away from the kayak, using the handle at the front of the skirt, while under water. This allows them to detach from the kayak and swim to shore. Kayakers call this a wet exit. Then, they may need to portage around the rough water, as described in the previous chapter, and must work to keep track of their kayak and other gear. As with portaging, there is no shame in having to bail out of your boat. A kayak may get stuck in debris which makes rolling impossible, or a kayaker may lack the confidence and skill necessary to roll. A student may encounter a rapid, which in our metaphor is a difficult learning situation, before they are ready to move through it and so are not ready to complete a successful roll when they are tipped out of their comfort zone. However, rolling is preferable to getting out of the kayak and can allow the paddler to continue their journey with minimal interruption or stress. Teachers can help students prepare for a roll by practicing them in safe situations, so they can later successfully complete one in a difficult learning situation, causing them to gain confidence as they work through challenging material or ideas on their own.

Many kayakers learn to roll in a pool or in a calm section of a river or lake. Like with any learning, beginning kayakers need support from experienced instructors or peers in a safe environment before trying a roll on their own. It can be shocking to have your head suddenly pushed under water by the rapids, causing someone to forget their technique. Having another person standing in the water in case of

distress is crucial to increasing a learner's confidence, as well as allowing them to see that taking the risk of rolling can have a positive benefit. To complete a practice roll, you sweep the paddle away from the kayak while leaning in the same direction, which brings the boat over sideways. Then, place one kayak blade (the kayak paddle has blades on both sides, unlike a canoe paddle) vertically in the water into the "strike position." The paddler next moves their hips sharply while continuing to move the paddle, which twists them underwater, and brings the paddler above the surface on the opposite side. Meaning, if you go into the water on your right side, you will twist so that you continue your motion to come up on the left side. In a learning situation, students who struggle are sometimes trying to go against their learning rather than work through or with it. They may oppose a new problem for lack of understanding and when they falter, may want to backtrack (try to exit the water on the same side of their kayak from which they entered it) or give up (making a wet exit when it is unnecessary). A skilled teacher can encourage students to keep trying, using new strategies, until they are more comfortable with the material. I know I have told students to try to "roll with the punches," or their trials and mistakes, and picturing this as a kayak physically rolling through the water can help us imagine students rolling through learning difficulties, remaining in the learning experience, and being ready to try to keep paddling (Fig. 7.2).

When learning to roll, kayaking instructors will scaffold beginners' learning, just as a classroom teacher does. The instructor will likely go over the equipment, asking new kayakers to practice putting on and releasing their spray skirt from their kayak while on land before they even get into the water. They may ask beginners to simply capsize their boat and stay underwater for a few seconds, gaining comfort with the disorienting feeling of being underwater and upside down. It is also important to practice a roll on both sides of the kayak, as a paddler needs to be skilled on both as you cannot control on which side you turn over. The instructor may also have students practice rolling a few times in a row, perhaps even with the same breath, as in heavy rapids or large waves this is a possibility. These steps help the newer paddler gain confidence in their techniques and get comfortable in a new situation before practicing the skill of rolling while also navigating heavy rapids and worrying about avoiding rocks or debris.

Fig. 7.2 A kayaker learns to roll in a pool

Combat Rolls

Once a paddler has practiced their roll and is confident, they may begin going on more difficult rivers, paddling through white water, or in heavy rapids. White water is fun for an experienced kayaker, and the speed is thrilling while also requiring skill and technique, similar to the rush an experienced classroom learner may feel with challenging material and a fast-paced curriculum. When a kayaker's boat flips while in white water (rather than in a practice situation or on calm water as described above) and they successfully flip themselves upright again, it is called a combat roll. In this situation, there are added factors to consider such as the river current, rocks, or other obstacles, and the temperature as colder water will be more shocking. This is why practicing in a pool or still water is essential, as these factors can be unpredictable or even invisible.

As a model for learning, a combat roll serves as a symbol for problem-solving in the moment. When students complete critical literacy

practices, they may be confronted with an idea that upends their worldview, feeling like they are flipping over. For some of our students, their worldviews were challenged when they learned how systemic racism can lead to mass incarceration, or that transgender People of Color can face discrimination in the healthcare system for their race and their gender identity and expression. Or, a combat roll can occur when students encounter a difficult text or other problem that temporarily disorients them, making them feel like they are in an alien environment or forget how to use their learning tools to get themselves upright again. However, with teacher supports in the form of prior practice, and student learning tools like a spray skirt serving as a support for their learning mindset, as well as self-confidence and a willingness to work through risks, students can continue through and beyond this difficulty. A combat roll in the classroom will leave students feeling confident in their learning and with their skill set and will allow them to continue on their learning journey with minimal interruption. The thrill of successfully completing a combat roll will increase student confidence and likely their motivation to continue problem-solving, as it did with the Podcast Boys in the previous example.

7.2 Rolling in a Social Justice Classroom

The sense of the unknown that can come from learning to roll, as well as completing a combat roll, is relatable to a queered classroom where there are less boundaries (Britzman, 1995), which requires students to take risks. This increase in freedom also means that students have more chances to take risks that a teacher cannot predict. However, if a teacher can help students learn how to turn themselves back upright in a safe environment, when they are later faced with disorienting and difficult situations, they will be more successful doing this on their own. In a classroom, it is common practice to scaffold learning in a similar way to the kayaking instruction described above so that students have support in learning how to complete tasks independently (Hammond & Gibbons, 2005). For example, if teachers want students to learn a new technology for creating a video, they may allow them to play with that technology first and create short videos of their choice. Then, if the ultimate goal is for students to create a video that analyzes a text, they can practice that skill separately, before bringing their technological and analytical skills

together in a final video project. In this way, students are not trying to learn how to create a sophisticated analysis while simultaneously learning new technical skills, which often leads to students feeling overwhelmed. While in a queered classroom there may be less boundaries and scaffolding, in my study I found that when students had no scaffolding it sometimes leads them to flounder in confusion—such as students who tried to work with texts above their reading level—rather than being able to critically engage with the material. In these instances, their confusion caused them to portage rather than roll. While there is no hierarchy between portaging and rolling, knowing how to do both is crucial to learning success.

Learning how to roll, or to regain your position and continue to move with your boat when faced with a difficult or shocking situation, can save time and energy rather than moving to shore and carrying your equipment in every such circumstance. I do not want to imply here that rolling is a synonym for resilience, a term with varied definitions and uses in educational research that refers to positive responses and outcomes from children facing adversity, usually used for children labeled "at-risk" (Lutha, Cicchetti, & Becker, 2000). Nor do I intend rolling to serve as a parallel to the concept of grit, a term also used to describe the ability of children (usually racial minorities) to recover from adversity. As critics have noted grit does not take into account the systemic racism and other oppressive structures that work on and against students (McGee & Stovall, 2015).

A queered classroom in pursuit of social justice must take into account where our students come from, how those origins and related structural issues affect them, and what tools they can use to navigate difficult situations. In our class, the students possessed a lot of privilege, and we hoped that by discussing social justice issues directly they could become what Swalwell (2013) called the "Activist Ally" (p. 8), meaning privileged students who harnessed their privilege to work with oppressed groups. Teaching these students to roll and portage, and how to judge when to do each, could help them stay engaged in social justice work and prevent them from becoming "The Resigned" (Swalwell, 2013, p. 5), meaning students who were overwhelmed by social justice issues and felt social change was impossible. While the example of the Podcast Boys' Web site above is a less dire example than working directly with oppressed people, this supported practice in class can develop the necessary skills to roll with difficult situations or seeming setbacks in the "real" world outside the classroom.

Rolling can also conceptualize teaching practices. Teaching requires adjusting lessons in the moment, no matter how carefully you planned your lesson and prepared your materials. Teaching for social justice may possibly require more of these adjustments, as it is not possible to anticipate every reaction students will have to diverse topics. Often, teachers who want to practice social justice can fear student, parent, and administrative pushback and may hesitate to introduce any topics deemed "controversial" (Shore & Freire, 2002). In this mindset of fear, when teachers are faced with a challenge they may tip over and struggle in an attempt to bring their kayak back up on the same side, rather than completing a roll and continuing on their teaching journey. With the support of colleagues and a foundation from a teacher education program steeped in social justice, teachers can successfully right themselves when under duress. They may feel shaky the first few times they have to complete a combat roll, such as addressing a parent complaint for the first time, but with practice their skills will increase. An experienced teacher may, for a few examples, be up-to-date on current research, know the school or districts policies on diversity and inclusion, and have aligned their lessons to curricular standards.

7.3 Roll Practice in Our Classroom

Returning to *Math for a Cause*, we had many instances of roll practice as we helped students work through skills and try new methods. While every skilled teacher uses scaffolding to guide student learning, a queered classroom will likely give students more chances to be in their secondary stability, and thus slightly out of their comfort zone. These classrooms will also give them space to tip their boat over completely when faced with difficulty, so that they will need to learn to roll to remain upright. Using queer pedagogy means stepping back more often and letting students direct their own learning, even if it means they may sometimes fail (or feel like they failed) or do not come to the teacher's expected outcome.

Racial Disparities and Stereotypes

Confronting racial disparities and examining racial stereotypes often caused our privileged and primarily White students to tip their kayak. One example was discussed in Chapter 4, when Morgan led the students

through a worksheet on percentages and the US prison system. Some students were tipped over by the shock of the high numbers of African-American and Latinx prisoners as compared to Whites. When Morgan said, "Now I didn't hear anybody look at these numbers and say, 'Oh that means that African Americans and Hispanics are bad people, are worse than White people because they're ending up in prison. So they must all be criminals.' Did that thought cross anybody's minds?" Rosette admitted, "A little." Because Morgan had created an open classroom environment and had frequently asked the students to share how they felt when faced with their calculations, Rosette was able to admit that she had tipped over in that moment, disoriented by the numbers. She followed up her "A little" comment with "But not a lot." Rosette was able to use her reasoning skills (serving as the spray skirt in this moment, to support her kayak, or her learning mindset), and our discussions about how People of Color are portrayed negatively in the media from our unit on Michael Brown and determined that her initial thoughts were likely untrue. Thus, Rosette was able to roll back upright and continue in her learning, using her own agency with Morgan's support. In the future, when faced with racial stereotypes, I hope that she will be able to roll back up on her own without the need for adult support.

Ally had a similar response, stating "Well the first thought that came to me wasn't just because they're bad people, because it's like a really popular but bad thing that's happening in our country where Black people are stereotyped, so instead of thinking that they're all bad I start to feel bad for them." Ally needed less support in this instance, and so was able to complete a combat roll, with Morgan nearby in case she struggled. In the cases of Ally and Rosette, the students had the background knowledge and practice to successfully roll and continue thinking with a social justice mindset about the material.

Other examples of students sorting through their ideas of race, especially racial stereotypes, occurred during small group discussion. During the first unit on Michael Brown,[1] when Sum Dood, Justin Case, and Sue Denim were first pretending to be on a podcast as they worked through their article, Sue Denim and Sum Dood chastised Justin Case for saying, "OK I was gonna make a really racist joke." Sue Denim responded "What the heck dude, why? That's not even funny." When Justin Case proclaimed "I was kidding, I wasn't actually going to do it" his group members still held him accountable. They repeated that his statement was not funny and immediately shut down the conversation. In some

spaces in the broader community surrounding The Anchor School, it would have been acceptable for a White person to make a racist joke. In this case, even stating that you were thinking about making such a joke, not even saying it aloud, was cause for censure. While Justin Case had tipped his kayak over by admitting to thinking a racist joke, his friends helped him roll back upright by their quick responses. This also could have been a case where the whole group tipped over as the admission was shocking to Sum Dood and Sue Denim, but they were able to dialogue with Justin Case in the moment and remained in their secondary stability, waiting for Justin Case to join them.

Marriage Equality

In the beginning of the third unit, when everyone was working on marriage equality, we began with a scaffolded worksheet that included critical literacy and critical mathematics activities. I had created it based on a local newspaper article discussing the recent statewide legality and the immediate increase of same-sex marriages in the county where The Anchor School was located. We also included this in the curriculum as we wanted our students to be able to use our course as a moment of celebration for this happy occasion. One of my questions stated:

> The Register of Deeds (responsible for processing marriage licenses) said that normally the office processes between 12-15 marriage license applications per day. But on October 13th, the office processed around 50. Estimate how many of these applications were from same-sex couples.

Working outside of my disciplinary home of English, I did not realize that it was unusual for a middle school math problem to include a range of numbers from which to begin your calculations. Therefore, I received many questions from student groups that were confused on what to do with 12–15, and this confusion tipped them from their secondary stability to being completely off balance. Many expressed that they had no idea how to begin their mathematical calculations. With support, they realized one way to find an estimate was to pick a number between 12 and 15, and so their answers varied between groups. This effected their answers to the next question, which read, "Using your above estimate, calculate the percentage of marriage license applications from same-sex couples in our county on Monday, October 13th." In this way, students

were continuing to practice their skills working with percentages, something they were gaining confidence in, with the new skill of estimating to learn more about a social justice cause that was important to them.

Students were able to see that they could have different answers, and try different ways of solving the problem, which may have helped the Podcast Boys realize their later mistake in the chapter's opening example. Letting students try different methods, even if they fail and tip their boat over, is important to instilling confidence in their abilities. It is also important for students to learn that falling over does not mean you should quit trying. We also gave students space to reflect during this activity, as the following question was "What is your reaction to these numbers?" By asking students to pause in an eddy after they were thrown off balance in the previous questions, they had time to breathe and think deeply about their results before moving on to their next task.

Another example of roll practice occurred before we asked the students to work in small groups on their final project on same-sex marriage. To continue helping students learn to read and calculate percentages critically, we created a way for them to explore same-sex marriage debates through investigating polling data, so we could help them roll as needed. To mimic the practice they had with the prison populations worksheet, I created an activity on polling data regarding same-sex marriage from an easily-accessible Web site (pollingreport.com). Students were asked to look through the data and complete the following:

1. In general, how have the opinions about gay marriage changed over time? Give specific data to support your answer.
2. Compare the percentages of people who think gay couples should be allowed to adopt and should be protected against job discrimination with the percentages of people who think gay couples should be allowed to adopt and should *not* be protected against job discrimination. What do you notice?
3. Find data that asks people's opinions about same-sex marriage in general vs. data that asks about same-sex marriage in their state. Are there any noticeable differences? Why or why not?
4. Create your own math problem based on something else you can find in this data. Be sure to explain what you are looking for and then answer your questions.

This worksheet included many skills and techniques we had already worked on: (a) primary stability of practicing a skill: "compare the percentages"; (b) secondary stability of interpreting data on their own: "find data that…"; (c) catching an eddy to reflect: "What do you notice?" and "explain what you are looking for"; and (d) the chance of rolling while they "create your own math problem" or find data that they have difficulty interpreting. By helping them roll through some difficult problems as a large group, they could then continue moving through problems on their own with greater confidence.

After completing their worksheet, and the previously discussed one on same-sex marriages in the local community, students Ashley, Ally, and Rosette decided to use the polling data to find the average percentage of the increase in favorable opinions toward same-sex marriage. For their final project for this third unit, they created a video using that data to persuade a larger audience that same-sex marriage was important. Aiden and Jimmy Smith, who were also creating a video, began by converting the percentages on poll questions they were interested in to numbers as they thought actual numbers of people might be more persuasive than percentages of opinions. They looked up the US population and used that with the favorable percentages of people who supported same-sex marriage and other queer rights issues to complete their calculations. Another group was interested in seeing the differences in opinions among different political parties, and the Podcast Boys began investigating suicide rates, as discussed in the opening vignette. Because all students had practice with looking through both quantitative and qualitative data about their topic, and had practiced a few different kinds of math problems, they were ready to kayak on their own to finish out the course on a positive note and were also better prepared to deal with unexpected data or findings.

7.4 Knowing When to Roll

There are times in the classroom when teachers are faced with trying to convince students to keep pushing through a difficult situation even when they get tipped over (rolling), versus going around the problem all together (portaging). When students worked through the previously described practice worksheets on racism in the prison system and same-sex marriage, they were able to create mathematical investigations that were interesting and asked more sophisticated questions than their previous work. While initially I worried that in our final unit we had given

them too many boundaries and that I was putting too much structure into a queered classroom space, I realized this scaffolding and practice was necessary for them to continue learning on their own. My worrying about creating a curriculum that was "queer enough" for an imagined queer pedagogy court of my peers prevented me from seeing what my students needed, and so prevented me from rolling. By allowing more scaffolding at select moments, which allowed them to practice their own rolls, students thrived. This also likely prevented them from unnecessarily portaging around obstacles such as having to estimate and confronting racial stereotypes. In these cases, the obstacles were not insurmountable or harmful, and the students were able to work through them, gaining renewed confidence in their learning abilities.

Note

1. For a review of the units and student activities, refer to Table 2.1 in Chapter 2.

References

Britzman, D. (1995). Is there a queer pedagogy? Or stop reading straight. *Educational Theory, 45*(2), 151–165.

Hammond, J., & Gibbons, P. (2005). What is scaffolding? In A. Burns & H. Joyce (Eds.), *Teachers' voices 8: Explicitly supporting reading and writing in the classroom* (pp. 8–16). National Centre for English Language Teaching and Research. Oxford: Oxford University Press.

Luthar, S. S., Cicchetti, D., & Becker, B. (2000). The construct of resilience: A critical evaluation and guidelines for future work. *Child Development, 71*(3), 543–562.

McGee, E. O., & Stovall, D. (2015). Reimagining critical race theory in education: Mental health, healing, and the pathway to liberatory praxis. *Educational Theory, 65*(5), 491–511.

Rhodes, J. A., & Robnalt, V. J. (2009). Digital literacies in the classroom. In L. Christenbury, R. Bomer, & P. Smagorinsky (Eds.), *Handbook of adolescent literacy research* (pp. 153–169). New York: Guilford Press.

Shore, I., & Freire, P. (2002). What are the fears and risks of transformation? In A. Darder, R. D. Torres, & M. Baltodano (Eds.), *The critical pedagogy reader*. Milton Park: Taylor & Francis.

Swalwell, K. (2013). "With great power comes great responsibility:" Privileged students' conceptions of justice-oriented citizenship. *Democracy & Education, 21*(1), 1–11.

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

S. M. Pennell, *Queering Critical Literacy and Numeracy for Social Justice*, Queer Studies and Education,
https://doi.org/10.1007/978-3-030-11584-5_8

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.

References

An, S., Capraro, M. M., & Tillman, D. A. (2013). Elementary teachers integrate music activities into regular mathematics lessons: Effects on students' mathematical abilities. *Journal for Learning Through the Arts, 9*(1). Retrieved from https://escholarship.org/uc/item/0js732gf.

Bower-Phipps, L., Powell, J. S., Bivona, M., Harmon, R., & Olcott, A. (2017). Re-drawing the line: Queering our pedagogy in the early childhood classroom. In S. M. Pennell, A. S. Boyd, H. Parkhouse, & A. LaGarry (Eds.), *Possibilities in practice: Social justice teaching in the disciplines* (pp. 27–39). New York, NY: Peter Lang.

Britzman, D. (1995) Is there a queer pedagogy? Or, stop reading straight. *Educational Theory, 45*(2), 151–165.

Bull, K. B., & Dupuis, J. B. (2014). Nonfiction and interdisciplinary inquiry: Multimodal learning in English and biology. *English Journal, 103*(3), 73–79.

Burgess, K. (2018, July 24). Adoption law spurs fears of discrimination against LGBT kids in foster care. *The Wichita Eagle*. Retrieved from https://www.kansas.com/news/politics-government/prairie-politics/article215116760.html.

Butler, J. (2004). *Undoing gender*. New York and London: Routledge.

Common Core State Standards Initiative. (2018a). *English language arts standards, anchor standards*. Retrieved from http://www.corestandards.org/ELA-Literacy/CCRA/R/.

Common Core State Standards Initiative. (2018b). *Standards for mathematical practice*. Retrieved from http://www.corestandards.org/Math/Practice/.

DePalma, R. (2010). The no outsiders project: In search of queer primary pedagogies. *Transformations: The Journal of Inclusive Scholarship & Pedagogy, 21*(2), 47–58.

Epstein, J. L., & Dauber, S. L. (1995). Effects on students of an interdisciplinary program linking social studies, art, and family volunteers in the middle grades. *The Journal of Early Adolescence, 15*(1), 114–144.

Freire, P. (2000). *Pedagogy of the oppressed* (30th anniversary ed.). New York, NY: Continuum.

Gutstein, E. (2003). Teaching and learning mathematics for social justice in an urban, Latino school. *Journal for Research in Mathematics Education, 34*(1), 37–73.

Jones, C. (2010). Interdisciplinary approach: Advantages, disadvantages, and the future benefits of interdisciplinary studies. *ESSAI, 7*(1), 26.

Larson, E. (2004). *The devil in the white city: Murder, magic, and madness at the fair that changed America*. New York: Vintage.

Miller, J. L. (1998). Autobiography as a queer curriculum practice. In W. F. Pinar (Ed.), *Queer theory in education* (pp. 365–373). Mahwah, NJ: Lawrence Erlbaum Associates.

Muñoz, J. E. (2007). Cruising the toilet: LeRoi Jones/Amiri Baraka, radical black traditions, and queer futurity. *GLQ: A Journal of Lesbian and Gay Studies*, *13*(2), 353–367.

North, C. E. (2009). *Teaching for social justice?: Voices from the front lines*. Boulder, CO: Paradigm Publishers.

Pekter, N., & McAskill, B. (2014). "To be English, Math, and History": A multidisciplinary project for students and teachers. *English Journal, 103*(3), 48–55.

Pennell, S. M., Boyd, A. S., Parkhouse, H., & LaGarry, A. (Eds.). (2017). *Possibilities in practice: Social justice teaching in the disciplines*. New York, NY: Peter Lang.

Sandholtz, J. H. (2000). Interdisciplinary team teaching as a form of professional development. *Teacher Education Quarterly*, 39–54.

Sleczkowski, C. (2017, March 30). 20% of millennials identify as LGBTQ, according to new GLAAD study. *The Huffington Post*. Retrieved from https://www.huffingtonpost.com/entry/20-percent-millennials-lgbtq-glaad-study_us_58dd140be4b05eae031d8f9c.

Warnick, B. R., & Stemhagen, K. (2007). Mathematics teachers as moral educators: The implications of conceiving of mathematics as a technology. *Journal of Curriculum Studies, 39*(3), 303–316.

Whitlock, R. (2010). Getting queer: Teacher education, gender studies, and the cross-disciplinary quest for queer pedagogies. *Issues in Teacher Education, 19*(2), 81–104.

Glossary of Kayaking Terms

Blade: The flat part of the kayak paddle that catches the water in a paddle stroke to move the boat. Kayak paddles have blades on both ends, unlike a canoe paddle

Bow: Front of the boat

Cockpit coaming: The opening of the kayak where the kayaker enters the boat

Combat roll (also see rolling): When a kayaker rolls their kayak while in a rapid and continues paddling without getting out of the boat or going to shore

Eddy: A feature of a river, created by the current hitting an object (such as a rock sticking out of the water), which causes a relatively-still space behind the object, protected from the current. Kayakers "catch eddies" when they use this space

Edge: When used as a verb, it refers to a kayaker leaning over in their boat, so the boat is riding on its edge through the water rather than the flat bottom

Portage: When a kayaker paddles to shore and carries their boat and other gear around an obstacle in the river. Portaging may also occur when the water is too shallow to paddle

Primary stability: The feeling of the kayak when it is sitting flat on the water

S. M. Pennell, *Queering Critical Literacy and Numeracy for Social Justice*, Queer Studies and Education,
https://doi.org/10.1007/978-3-030-11584-5

Rolling: When a kayak tips their boat over, and then successfully flips the boat back upright by twisting their body and using their paddle without exiting the boat

Secondary stability: The feeling of the kayak when it is tilted on an edge

Spray skirt: Worn by the kayaker around the waist, this stretchy waterproof device attaches over the lip of the kayak opening, sealing the boat and keeping water out

Stern: Back of the boat

Whitewater: Water with heavy rapids, so named for the white color of the foam on the water's surface

Index

S. M. Pennell, *Queering Critical Literacy and Numeracy for Social Justice*, Queer Studies and Education,
https://doi.org/10.1007/978-3-030-11584-5