KALEIDOSCOPE:

EDUCATOR VOICES AND PERSPECTIVES

Photo by Genaro Vavuris

KSTF
Knowles Science
Teaching Foundation

ABOUT KSTF

The Knowles Science Teaching Foundation (KSTF) was established by Janet H. and C. Harry Knowles in 1999 to increase the number of high quality high school science and mathematics teachers and ultimately, improve math and science education in the United States. The KSTF Teaching Fellows Program, the Foundation's signature program, awards five-year Fellowships to promising early-career, secondary science and mathematics teachers, and supports them in their efforts to improve education in their own classrooms and beyond. The KSTF community includes more than 300 Fellows who taught science, math and related subjects to nearly 30,000 high school students during the 2015–2016 academic year. For more information, visit www.kstf.org.

IN THIS ISSUE

INTRODUCTION

Kaleidoscope generates and shares knowledge and stories crucial for strengthening the teaching profession and the improvement of education, particularly in STEM disciplines. We publish articles by KSTF Fellows and their collaborators that explore knowledge of, for, and about teaching—all through the prism of lived experience, both struggles and successes, in educational endeavors. In doing so, we support and make public the work of teachers and other education professionals developing deeper understandings of students, teaching, and ourselves as learners. *Kaleidoscope* provides a unique platform for writers and readers to investigate new ideas, provoke thoughtful reflection and dialogue, and effect change in teaching and educational practices.

We are humbled by, and grateful to, the writers in our community whose work we feature in the fourth issue, primarily because we know that the work of developing as an education professional can be messy, turbulent, or downright stormy. Uncertainty, in particular, can be disquieting. A common theme woven through the stories you'll read here is how we develop self-awareness through uncertainty, whether that uncertainty is the task of documenting and sharing educational practices for a broader audience, learning to navigate a thorny classroom management situation, developing leadership identities, or discovering a jarring truth about one's own beliefs in the system. It is often the challenges we face as educators, and our reflection on those challenges, that push us to grow as individuals for the benefit of our students and/or colleagues.

2014 KSTF Teaching Fellow Eric Rasmussen found himself struggling with classroom management early in his teaching career. Here, he describes how a restorative justice protocol helped his students make community connections within his science classroom. Rasmussen offers both a helpful narrative of the protocol's implementation and a thought-provoking reflection on his own growth. His and his students' experiences have much to teach us about the vital importance of classroom relationships in motivation and engagement.

Senior Fellow London Jenks was about to walk away in frustration and resignation from two struggling students in his classroom. What happened as a result transformed his teaching to place greater emphasis on the autonomy students hold and shifted his role from owner-of-knowledge to facilitator. Through describing his intellectual journey, Jenks urges us to look, deeply and critically, at the classroom experiences of our students.

KSTF Teaching Fellows Nicholas Chan, Sarah DiMaria, Brenda Minjares, Sheila Orr, Dwaina Screen, Allison Stafford, Sophie State, and Michelle Vanhala were inspired at the KSTF 2015 Summer Meeting by José Vilson's call to action to make the work and craft of teaching more public. By participating in the #teach180 hashtag on Twitter, in which users provide a daily snapshot of their teaching practices and what students are doing in their classrooms, the authors found opportunities for reflection, building community, and reframing of difficult experiences. Their article, ending with their own call to action, highlights their use of an uncertain, very public medium as a vehicle for practicing and uncovering teacher voice.

KSTF Senior Fellows Heather Hotchkiss, David Streib, and Catherine Steinmetz chronicle how their initial assumptions about teacher agency were upturned as they embarked on a shared inquiry into leading from the classroom. Their realization that developing trust in collaborative relationships in their local contexts, as well as the themes that emerged during their investigation of what's required to develop that trust, will be evocative for anyone in education who seeks a framework within which to develop agency.

Finally, KSTF Senior Fellow and outgoing Editorial Board member Scott Stambach documents his experiences working with Tibetan monks in India to develop their science understandings. His essay gives the reader a unique window into his cross-cultural journey, particularly his deepening understanding of his own role as a science educator and the meaning of science education in today's world.

We proudly encourage readers to share this issue with teachers, students, and anyone else who is interested in education. If you have any comments or questions, please contact us at kstf.journal@kstf.org.

The *Kaleidoscope* Editorial Board welcomes all feedback. Please email our editorial board at kstf.journal@kstf.org.

CONNECTION CIRCLES: HOW TO ESTABLISH A RESTORATIVE CIRCLE PRACTICE

BY ERIC RASMUSSEN

Eric Rasmussen
is a 2014 KSTF Teaching Fellow who teaches at Silver Creek High School in Longmont, Colorado. At Silver Creek, Eric teaches honors biology, college-prep chemistry, and general chemistry. In addition to these curricular duties, Eric sponsors the astronomy club, co-sponsors the Gay Straight Alliance, has spearheaded the establishment of school-wide restorative practices, and works with students involved in independent studies at the University of Colorado Boulder in the field of neuroendocrinology.

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Teaching is hard.

I still remember standing alone in my classroom the day before school started. I had finished arranging the desks, putting up the quintessential science posters, and reflecting on how great my first year as a high school teacher would go. I stood there, looking into the future with wide-eyed optimism fueled by a dose of naivety. I had a firm grasp on my content and imagined how easy it would be to pass this knowledge onto my students in the same way as individuals such as Bill Nye had done for me. However, teaching is not as simple as distilling and passing down knowledge to a class of attentive scholars. It is a demanding position where the teacher must establish a dynamic balance of navigating the undulating terrain of skills, emotions, and cultures brought about from the 30 differing life histories of the students.

The fundamental issue I encountered during my first year of teaching revolved around classroom management. During this time, I quickly came to discover being autonomous as a teacher can be both a blessing and a curse. My school serves predominantly white students from high socio-economic backgrounds. Because of these demographics and societal makeup, teachers at my school are treated with an attitude of professionalism. By this, I mean there are very few school-wide discipline policies, nor are there behavioral expectations aside from achieving academic success. Instead, all policies and expectations fall onto the individual teachers to develop and implement in their own classes. Unfortunately, as a first year teacher, these were policies I was not adequately trained or ready for. While reading *This Is Not a Test* (2014) by José Luis Vilson, I was transported back to my classroom in nothing short of a literary Proustian moment when Vilson described one of his most challenging classrooms:

> After the requisite ten minutes it took to settle them down at the beginning of class, they finally would sit down and start writing. But the talking was absolutely incessant throughout my lesson and anything I could muster resembling a sequence of thoughts would fall apart. By the twenty-fifth minute of class, I just went straight to the kids who wanted me to teach and focused on presenting the lesson to them (p. 134).

I grew increasingly frustrated as students disengaged themselves

from the course by speaking over me. Eventually I fell into a pattern of excusing students from the classroom and having them sit outside in the hallway. Such a strategy quickly backfired on me as lessons ground to a halt, and behaviors did not change. The same students continued to be disrespectful, and round and round in the negative feedback loop we went. Ironically, the escape from this circular pattern was in another circular pattern— connection circles.
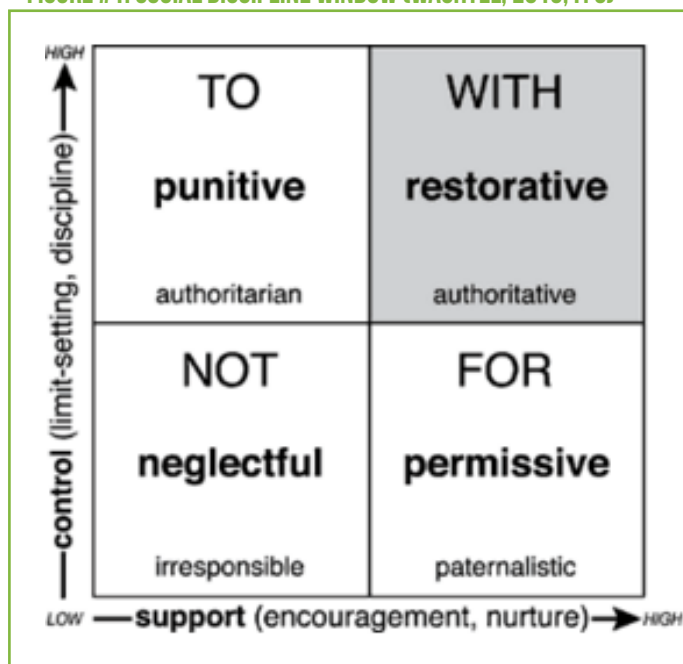
BRINGING A RESTORATIVE FRAMEWORK TO THE CLASSROOM

My experience with connection circles began during March of the 2014–15 school year after I attended a seven-hour professional development course entitled "Restorative Practices in the Classroom." This course was provided by my school district and was facilitated by the Longmont Community Justice Program (LCJP - www.lcjp.org). During this course, I was taught that connection circles are a subset of a larger system of practices known as "Restorative Practices." These practices adhere to a basic set of principles and values as expressed in the 5 R's: Relationship, respect, responsibility, repair, and reintegration. The essence of a restorative philosophy is that relationships are affected by rule-breaking, wrongdoing, or conflict and can be healed by a respectful process that offers students the opportunity to take responsibility for how their choices have affected the person(s) most directly harmed, the school community, and themselves.

This framework served as a paradigm shift for me as my attention before rested on a punitive approach rather than a restorative approach. The underlying premise of restorative practices rests with the belief that people will make positive changes when those in positions of authority do things *with* them rather than *to* them or *for* them (Wachtel, 2013, p. 3). This idea is summed up in the Social Discipline Window (SDW) (Figure 1), which demonstrates that a restorative approach requires a balance of high levels of control/limit setting with high levels of support, encouragement, and nurture.

As many first-year teachers tend to do, I defaulted towards the "For" square. I desperately wanted students to like me and felt the best way to accomplish this was to act as more of a buddy. I

FIGURE #1: SOCIAL DISCIPLINE WINDOW (WACHTEL, 2013, P. 3)

had lax rules and control, treating students similar to colleagues. Unsurprisingly, this system had the opposite effect of what I intended. Students did not respect my authority and did not take what I deemed important seriously. These behaviors would cause me to overshoot in the SDW into the punitive square when I would send students into the hall. In reflecting on the SDW, I came to the realization that my favorite teachers were the ones who fell into the "With" square; these teachers were warm and caring but also had very specific limitations and expectations in their classrooms. I wanted to push myself into the "With" square; all I needed was a practice to get me there.

CIRCULAR REASONING

Connection circles are a relationship building process used to promote understanding, share experiences, build relationships, and establish a circle practice. To begin, I took my class into the hallway where we all sat cross-legged in a circle. I then introduced the connection circle by stating its purpose and establishing very specific ground rules provided to me by LCJP (here we come to the limit-setting found in the SDW). Rules included:

- Please listen and speak with respect: language—both verbal and nonverbal—can be quite powerful.

- Respect everyone's privacy—only tell your own story.
- Share time fairly.
- Please speak only when you have the talking piece.
- As the facilitator, I may need to speak to move things along.
- You may pass, but help us remember to come back to you.

Once all the rules were in place, I then introduced the talking piece by explaining the significance of the object we passed to indicate the speaker and how it related to one of my questions. The first day I used a toy turtle and stated how it was one of my most-prized possessions because my friend, a friend who passed away, bought it for me while he was on vacation. Because I shared this personal account with my students, they immediately realized the connection circle was important to me and that they should respect the practice. With this, I then asked the question: "If you could go on a dream vacation, where would you go and why?" This question was followed by, "If you could have any superhero power, what would it be and why?" My last question was more class related: "What is one topic from this unit you have mastered, and one you feel less comfortable with?" Although the first two questions seemed blatantly off topic such questions are necessary and serve as a foundation for future practices. Connection circles function best if there is a culture for relationship and community building already established. I conducted the connection circles with every class nearly every day.

At this point, I would like to stop and address two questions the reader may be thinking:

1. "This sounds fairly elementary; my high school students will hate this."
2. "You said you did connection circles every day? I can't do that, I don't have that much time!"

Beginning with the former, I will agree with you. I thought the exact same thing: I just *knew* my students would hate connection circles. As it turns out, I did not have as good of a read on my students as I thought because they loved it! Within three practices, I had students entering my classroom asking, "Are we going to have a connection circle today?" and "Can I suggest a question for the

connection circle?" It even got to the point where I handed the role as the facilitator to the students and they asked their own questions.

The underlying premise of restorative practices rests with the belief that people will make positive changes when those in positions of authority do things with them rather than to them or for them.

As for the more pressing question: yes, I did connection circles almost every single day, and yes, it took a lot of time (each practice takes about 10 to 15 minutes). Paradoxically, though, I ended up with more instructional time because of connection circles. Not only did classroom management issues largely disappear, I was able to tie content into the connection circles. For example, I would hold a connection circle at the end of the day and ask questions like, "If you could write one review question from today's lesson what would it be?" or "What do you think was the big idea from today's lesson?" Sometimes I would hold a connection circle at the beginning of class and ask questions like, "What is one thing you already know about volcanoes?" to prime the proverbial pump. Before we started our climate change unit in Earth Science I asked, "If someone had a different viewpoint than you, what is a strategy you could use to work with them?" Connection circles were also wonderful for grooming substitute teachers or handling misbehavior in the classroom (e.g., "What is one expectation you think I have for the class with the sub tomorrow?" and "Who is affected when people get up from their seats without asking?").

Connection circles were one of the most significant contributions I made to my classroom because of the sheer power they had in restructuring the community and classroom culture. I was able to converse with my students in a way I never would

have imagined, which allowed me to learn a great deal about them and visa versa. Additionally, the circles provided a source of structure that allowed me to place limits and expectations in my class that diminished classroom misbehaviors.

Most importantly, connection circles allowed the students to see themselves as part of a community and discover a great deal about one another. In one case, I asked the question, "What is one thing you need to leave at the door today so you can focus in class?" A universal answer among the students was their phones, but one student said, "I need to leave my depression at the door." It was a remarkable moment to witness students opening up in ways they may never have, and feeling safe enough to do it. I had another student who almost never participated in class. He would seclude himself from group work and never answer questions, even during connection circles. However, after about a month of the circle practice, the student finally answered a question by giving a brilliant answer to "Who would win in a fight, Master Chief or Batman?" From this moment forward the student began to participate actively in class, whether it be in connection circles, group work, or any other social facet of the classroom. Throughout all of my classes walls fell, cliques broke down, and communities were built.

In the spirit of inquiry, I anonymously surveyed my students at the end of the semester looking for input as to how they felt connection circles served the class. The following are two pieces of unedited feedback I received:

> I have always loved connection circles. I know that we have them about once every week, and I always look forward to it. They are a great way to keep me relaxed, yet engaged while I listen to others and think of something clever and meaningful to say for myself. These circles create a comfortable place for me and my classmates to learn about each other and have a laugh while we are at it. Sometimes it is nice to discuss a question that isn't necessarily related to the class subject or unit. When we get back to class, I immediately feel comfortable and ready to learn. I feel relaxed and in the mood to discuss and answer questions, and it seems to me that everyone else is, too. Connection Circles would be great in all sorts of classes, and

especially those that require the students to interact with each other and answer questions. I feel like the circles take a lot of tension away when I am called on to answer a question aloud.

And:

> The first time Mr. Rasmussen brought the class outside in the hallway to sit in a circle for a connection circle, it was a very welcome surprise. They made it so I could learn something new about the people that sit next to me every day in class that I don't always get the opportunity to talk to. We would go around and answer a question that had to do with what we were learning in class and then we would answer a fun question. It was never anything extravagant, but when it came time to go back to class I always felt refreshed and more awake. School days are so long and connection circles really helped to break them up so that one class didn't blur into another.

I wanted to include critical feedback from a student as a counter-argument, but, in all honesty, there was none.

THE ROUGH EDGES OF A CIRCLE

Amazingly, this entire transformation began in March in a single school year. I mention this again in an effort to make the point that it is never too late to renorm. Should you attempt to implement connection circles, I suggest allowing them time to flourish, specifically about two to three months of doing connection circles at least once a week. Though I did it every class (two or three times a week), I understand such a time commitment may be a deterrent to teachers. Admittedly, my students warmed up to it

Most importantly, connection circles allowed the students to see themselves as part of a community and discover a great deal about one another.

faster than I anticipated, but this does not mean the process was not without its difficulties. I also strongly recommend using a written script/protocol with every engagement, and being very firm with the rules that are laid out ahead of time. For example, one rule states that only the individual holding the talking piece is allowed to speak. After engaging in many connection circles, I slowly became lax with this standard and watched as students began to treat the circle as a social gathering with their friends, completely disregarding what other students had to say. Once this mentality takes root, the connection circle becomes a clique-norming tool instead of a community-norming tool. To alleviate this, I wrote myself a script that I used for every circle and was very stringent about all of the ground rules.

Because the teacher must be very militant with the rules, the teacher must also juxtapose this with being open and honest with the students. I found that when I truly opened myself up to the students (e.g., describing my talking piece that came from a deceased friend), the students had more respect for the process. One student wrote in her survey:

> I have noticed that as a speaking prop, you have brought in some items that are close and personal to you. I'd like to say that I truly appreciate that—it makes me feel like you trust me and see me as a person equal to you. I think that brings us all closer together as a class INCLUDING the instructor (not just the students that know each other from other classes and times). Thanks for that!

The last caveat I would provide is to be aware of class size. Connection circles worked wonderfully in all but one of my classes, where, unfortunately, that class seemed to be too large to manage (38 students). Students had a hard time hearing others, resulting in the blossoming of side conversations and distractions. This was unfortunate because the class was unable to reap the benefits of restorative practices; the pervasive classroom management issues never diminished.

Connection circles can serve many purposes: building relationships, check-in/check-outs, sharing learning, establishing classroom norms, addressing classroom behaviors, etc. Although I was hesitant about implementing them at first, connection

Connection circles are a relationship building process used to promote understanding, share experiences, build relationships, and establish a circle practice.

circles had an absolutely transformative affect on my classroom. As José Luis Vilson (2014) states, "Every student, afforded the right amount of patience and understanding, has the ability to excel. Every teacher, with the right qualities, can contribute to a student's growth as a citizen of the planet" (p. 213). I wholeheartedly agree with this sentiment and argue that restorative practices are one such quality which work to foster classroom community and student resiliency.

In the spirit of connection circles, I will end by saying: *I would like to thank you all for listening to my story. As I think about our group of educators, I celebrate what we have achieved and joyfully look forward to hearing about your future success with restorative practices. Thank you again for reading.*

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CITATION

A FALSE SENSE OF STUDENT SUCCESS

BY LONDON JENKS

London Jenks
is a KSTF Senior Fellow. He teaches physics, earth science, and environmental science at Hot Springs County High School in Thermopolis, Wyoming, where he also supports teachers and students as the District Technology Director. London was a member of the KSTF teacher inquiry group, PING (Practitioner Inquiry for the Next Generation), for three years. London is currently in his sixth year of teaching and working on a master's degree in education leadership.

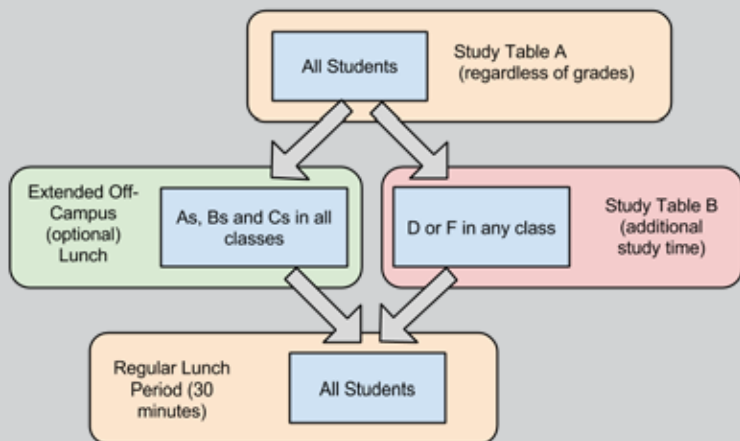London can be reached at london.jenks@kstf.org.

I am about to walk away from two students in need. I am about to turn a blind eye to their needs because of my own frustrations about their situation. I need a reprieve from the constant strain and effort. For months I've watched and worked with these students as they've struggled to raise a grade in one class while another grade drops, as they've become frustrated over failed efforts and given up, as they've fought with anger and determination against school policies put in place to help them.

Before this, I would not have tagged myself as someone concerned about social justice—you won't find it on my 140 character Twitter bio. But as this experience wore on I became greatly concerned about the welfare of these students and the failures of "the system." The impact that these measures had on my students changed my teaching to emphasize student voice and autonomy while changing how I view the systems we impose on students in the name of helping them.

During my first year teaching at a small rural school in Wyoming, the district began implementing an intervention locally known as Study Tables. The intervention was designed by school and district administrators not only to motivate students to maintain higher grades through rewards, but also to provide additional subject specific support, during the school day, to students who were struggling. All students attended Study Table A for 45 minutes to complete coursework. Following Study Table A, students on the "Warning List"—having a D or F in any class—were required to spend an additional 30 minutes on coursework from these classes. During Study Table B, students were sent to receive direct assistance from the teachers of these courses. Students with no Ds or Fs were rewarded with 30 minutes of extra off-campus lunch time.

I implemented the system as its designers intended. Throughout Study Tables A and B, I focused on the students with Ds and Fs. I ensured they were working on appropriate work, helped them in all areas I could, and connected them with their original instructors during Study Table B. I was genuinely concerned for their success. Like other teachers and administrators in my school, I saw immediate success with Study Tables. The students who had always done well continued to do so, and they were now receiving a reward for their commitment to school. Many students who historically struggled academically received additional support and one-on-one time with instructors. As a building, we greatly reduced the number of failing students compared

to previous years. The Study Tables system was having its intended positive effect on many of our students.

Even though I saw all of these successes, I was still troubled by some things about Study Tables. There was a grumbling that couldn't be settled. There were students who detested Study Tables and consistently complained about them, even those who would readily admit that it was improving their grades. In my own Study Tables class, I had two students the system and I couldn't reach: Jessica and Brandon.[1]

Jessica and Brandon shared a similar experience in my Study Table class. They both started the year like all students: they had no Ds or Fs and hadn't experienced any interventions of the system. As the year progressed, they both received marks that put them on the Warning List. Most students attending Study Table B were there for a week or two, raised their grades, and never returned. Jessica and Brandon were regulars. Despite the system and my best efforts, Jessica and Brandon still had Ds and Fs in multiple classes—no potential reward or current punishment seemed enough.

Jessica and Brandon went through multiple iterations of a shared cycle, where I both cheered them on and pitied them. They both were their own individuals

[1] Names changed

but also seemed to follow a similar cycle—at times even feeding off of each other's reactions. At times, one would rise from a moment of despair, gather their determination and honestly attempt to improve their grades. Often, they would raise one or two grades above the threshold only to have other grades fall below a C. Each would then go through stages where they regularly suffered through their daily 75 minutes of Study Tables. Despite at times being at disparate ends of the cycle, they both passed through its different stages. They would cycle between refusing to work, cursing teachers and the school, delight over completing assignments and raising their grades above the threshold, swearing they would never use anything they were being forced to learn, begging to go to lunch with their friends, and looking scathingly at other students who didn't have to stay behind in Study Table B. I even, sacrilegiously, began thinking of each of them as my "Study Table purgatory students"—students struggling to make their way out of a potentially temporary place through suffering and punishment.

I was as frustrated as they were; at times I even questioned "what is the point?" or "are Brandon and Jessica even capable of this?" I am ashamed to say that I even would go through bouts of giving up on them for a few days or even weeks. I would let them wallow in their self-pity with no outside encouragement and not question the days they would say they "had nothing to work on" when that was obviously not true. As a teacher tasked with implementing this system, I also felt restricted and confined. I felt no control over the situation. I simply followed the directions I was given. This was not the teaching environment I envisioned nor wanted to be responsible for. I always try to instill optimism in my students by embodying it myself, but I also fell into my own cycle of Study Table purgatory.

The plight of Brandon and Jessica was a rough point for me—how could a system that had been set up to help students hurt some so much? This grinding question led me to look deeper into their situation to try to understand their experience, to question my assumptions about the system, its intent, and the results. Why was their experience different from other students? How had I influenced their experience? Their situation also prompted me to collect data through school-wide student and staff surveys on the impact and experiences with Study Tables. These surveys supported both the success of Study Tables and some potential underlying issues. Many students stated that Study Tables was beneficial: "The time is

just useful and knowing you have extra time takes off a lot of stress." Other students expressed the benefit for themselves: "When you are an athlete you spend most of your time at school to begin with and we rarely have time to complete homework at home and get sufficient sleep so, therefore, I love Study Tables." Still others used the time to reach out to teachers: "I also like being able to go see teachers during Study Table B and to have a long enough lunch to eat and relax before taking more hard core classes."

Other students and teachers expressed agitation and frustration. One teacher stated, "It's a waste of time. Study Table B is basically a detention in my mind in which you force kids to stay. If kids want to get their work done they will, forcing them to stay later during lunch just makes them mad and is not productive." According to another teacher, "Learning to manage time and priorities in high school is essential to being successful post high school. I am concerned that Study Tables forces rather than teaches." Commenting on the value of Study Tables for all students one teacher expressed that "Study Tables only benefit those who use them properly. Consequently, good students benefit a lot from Study Tables. Apathetic students realize almost no benefit from Study Tables."

I systematically observed Jessica and Brandon and reflected on their situation and my interactions with them. In addition, I worked with KSTF's Practitioner Inquiry for the Next Generation (PING) project: a group of educators from across the country who were also raising questions about how to support struggling students in their own contexts. Through this collaborative effort, I analyzed my interactions with Brandon and Jessica and the internal conflict these interactions caused in order to deeply reflect on what it meant for me and my students.

I found myself weighing the benefits I saw from the Study Tables system—the significant number of students who maintained higher grades (and theoretically increased learning) throughout the course of the year against the negatives of the system for students like Jessica and Brandon who were experiencing school as a place of confinement and punishment. I asked myself questions like: Is this what school should be like? Is this anything like the fabled "real world" we supposedly are preparing students for? Are districts and teachers institutionally aware of students like Jessica and Brandon who continue to fall

through the cracks? These are the kinds of questions that don't have easy answers, or answers at all.

Through this inquiry, where I employed multiple methods of observation and reflection that have been explained above, I found the Study Tables system had one of three effects on students: some performed equivalently to how they would have without it; some were helped by the system; and some, like Jessica and Brandon, were hurt by the system. I saw a few key factors that played a major role in Jessica and Brandon's inability to benefit from a system honestly designed to help them. These factors are choice, voice, and autonomy.

As students progress through school, they are allowed fewer opportunities for choice and must learn to "figure out" what others want them to do—they must become accustomed to complying with an external system. Students in Study Table B experienced a removal of choice that was open to their peers; some students had an extended lunch while others had forced study time. This formed a clear separation and a clear "moral of the story" for students: *the "smart" kids get rewarded and the "dumb" kids get punished*.

This was not the teaching environment I envisioned nor wanted to be responsible for. I always try to instill optimism in my students by embodying it myself, but I also fell into my own cycle of Study Table purgatory.

Through this experience I can now see that many of the things we do in school have a similar impact on students as Study Tables did on Brandon and Jessica. There are bells that tell you where to go and when to go there, rules and obligations that differ classroom to classroom, and adults who regulate whether you get a drink or use the restroom; these are very basic and simple choices that nearly every person in the world

has command over, but often not students. In many ways we are preparing them for a "real world" that doesn't exist. This is one of the unfortunate "stories of the world" we inadvertently, but very clearly, teach students in a system of education that continually removes their choice, voice, and autonomy.

It was a moment of realization when both of my students, Brandon and Jessica, left the normal school system mid-year for environments they saw as affording more choice and autonomy. Both moved to alternative learning environments, although they took different paths. Jessica dropped out of our school and enrolled in an online school. I don't know if she ever received a diploma. Brandon got a GED and takes intermittent courses at a local community college; however, he has few concrete plans for his future.

The experience with Brandon and Jessica deeply changed my attitudes towards and goals for teaching and learning. Their experience and my involvement in perpetuating it has developed into a multi-year quest to recreate my classroom environment. I am exploring what happens when I release ultimate control and provide more choice, voice, and autonomy in learning to my students. Through an enduring effort to continually refine, reflect and improve, my students have much more individual control and involvement in their learning.

I have come to understand that an *active learning environment* isn't just about having students actively engage in an activity but instead requires student agency in what they are doing. This agency (or choice, voice, and autonomy) may include the topic, the time, or the product. I still help guide the end result of the learning, but how students learn is more open than ever before. I have found that providing this change is as simple as having multiple versions of a task and letting individuals or groups of students select the version they would prefer (i.e., reading assignment vs. video vs. diagrams vs. direct instruction from me). I have changed my class so that student teams select what assignments they will complete each day—they know their goal, their requirements and their learning targets—and they are trusted to be responsible.

Through this change, I have witnessed students developing and practicing skills that will allow them to be critical thinkers and problem solvers. Because of the learning environment I have created, my students

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have more ownership of their learning and are better able to discuss and debate their understanding and apply it to situations outside of our classroom. For example, students in my environmental science course recently defended recommendations for a deer management plan before our Town Council, which is struggling to cope with various issues surrounding an overpopulation of deer. I have found that giving students some control over their classroom experience makes it more likely they will choose learning over anything else.

These changes have also dramatically changed my role as a teacher: I am no longer the ultimate planner and owner/disseminator of the content for my students. I now serve as a facilitator in their learning and growth. I used to direct what students did each day: which assignment, which reading, and when they should be finished. Now I provide students all of the expected assignments for a unit (including options between various formats on some), the final expectations and goals, a final due date, and a few check-in points along the way.

This simple process has put much of the power in my classroom back in student hands. I regularly see students exercising autonomy in collaborating together to prioritize their time and focus on areas that they need the most help with—something that good teachers always try to do for their students. I see students exercising personal choice by deciding to work on team assignments during class while they assign each other reading assignments as homework. I see students prioritizing their class time so they can receive feedback on their work from me. Teams exercise their voice by setting their own deadlines to

hold each other accountable. As a result, I spend less time monitoring and enforcing deadlines. Instead, I am focused on student understanding. I am a much more fulfilled teacher.

The most critical personal growth to emerge from this inquiry into two students in my classroom has been my own, resulting in a fundamental change in the teaching and learning experience for all students in my classes. This came from the deep and critical inquiry into the experience of two students in my class. By observing and deeply reflecting on the personal interactions that take place each day, a teacher can glean the evidence needed to shift and evolve their classroom instruction to provide more complete and meaningful learning and develop the skills and attributes of lifelong learners in students.

CITATION

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#TEACH180: A WINDOW INTO OUR CLASSROOMS

BY NICHOLAS CHAN, SARAH DIMARIA, BRENDA MINJARES, SHEILA ORR, DWAINA SCREEN, ALLISON STAFFORD, SOPHIE STATE, AND MICHELLE VANHALA

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How do teachers offer insights into their practices, successes and struggles while simultaneously elevating their voices? #teach180

#teach180 is a hashtag and idea, originally started by Sarah Hagan (@mathequalslove), a math teacher who blogs at mathequalslove.blogspot.com. Born out of the #blog180 movement, where teachers blog daily about their work in the classroom, #teach180 teachers tweet a picture and up to 140 characters about their daily classroom experiences.

At the Knowles Science Teaching Foundation 2015 Summer Meeting, we heard José Vilson, New York City math teacher and author of *This is Not a Test* (2014), speak about teacher voice. On his website, Vilson (2013) defines teacher voice as "the collective and individual expression of meaningful, professional opinion based on classroom experience and expertise." Vilson, an avid blogger and tweeter, issued a call to action to the teachers in the room, asking them to join him in his effort to elevate the teaching profession from within the classroom by sharing our stories.

As a KSTF community, several of us decided to get involved with #teach180. Similar to our different reasons for entering the classroom, our purposes for joining and continuing to use the #teach180 platform as a way to elevate our voices and profession vary.
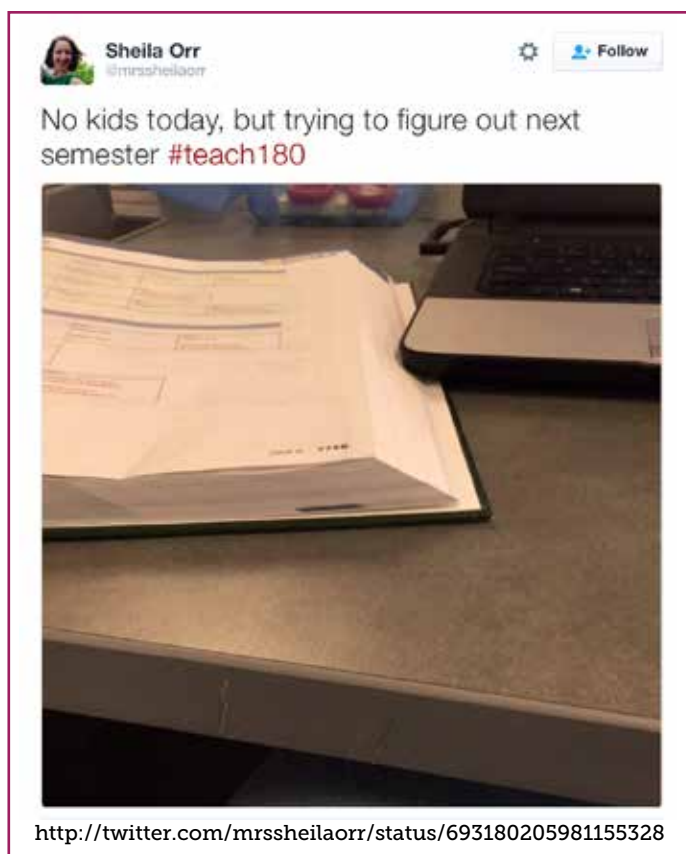
MOTIVATION

Participating in #teach180 allows us to expand our audience of classroom observers, while accepting feedback and being open to the possibility of collaboration. In some cases the practice of sharing glimpses into the classroom helps elevate the school and counteract negative media spin. Some of us work in places that are not favorable to teachers and their schools. By sharing our classrooms and what happens in them, we are slowly shaping public opinion of these schools. In other cases, we use #teach180 as a way to connect to students and parents over social media, allowing parents to see exactly what and how their students are learning. Finally, we identify being able to connect with other teachers around the country as an important part of participation in #teach180.

IMPLEMENTATION

The premise of #teach180 is to post a picture or reflection each day—180 total tweets for the 180 days of the school year. Although

not all of us have accomplished this in reality, we make an effort to post often enough to provide an accurate portrayal of our classroom processes and interactions. Photos and reflections take the form of student work, students engaging in activities, tasks prior to implementation, and classroom set-up. We follow our school district's policy for posting photos of students. Professional development tasks are shared, questions are posed, and answers posited. Via their Twitter feeds, teachers from around the United States are linking materials, sharing out lesson ideas, and celebrating and struggling together.

Sheila Orr
@mrssheilaorr

No kids today, but trying to figure out next semester #teach180

http://twitter.com/mrssheilaorr/status/693180205981155328
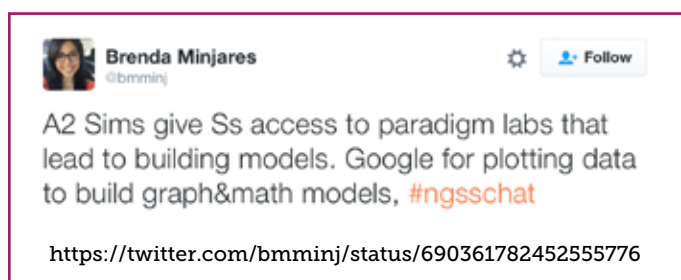
BENEFITS AND CHALLENGES

As is the case with teaching, we are finding that our participation in the #teach180 movement produces many benefits as well as challenges that can be expected as well as unanticipated. Just as our students learn about themselves from their own engagement with course content, we are learning more about ourselves as teachers as we reflect on our own teaching and how it is changing and responding to our involvement in this social platform.

Via their Twitter feeds, teachers from around the United States are linking materials, sharing out lesson ideas, and celebrating and struggling together.

Primary among the benefits of our participation in #teach180—whether we post photos daily, every other day, or simply when we remember—is the opportunity to showcase different aspects of teaching and learning in a variety of ways. The task of taking a picture or posting an update forces us to search for various ways to represent what we are doing in our classrooms to show learning and gives us the opportunity to consider various forms of data we could be collecting in our classrooms. Depending on what we are sharing, there are considerations about how we can document this work. In this way, we are generating classroom data not only for our immediate reflection, but also for initiating collaborative and critically reflective conversations within teacher communities through Twitter. Initiating these conversations allows us to do more than simply document a year in the classroom; it also engages those far and near in the process of our own growth—an important aspect of professional growth as teachers.

Perhaps the greatest consequence of our participation in the #teach180 movement is the opportunity to generate community and reflection. Many teachers find teaching to be an isolating experience unless structures are intentionally built into a school or district culture around collaboration and reflection. Through our participation in #teach180, we are discovering ways to create windows into our

Brenda Minjares
@bmminj

A2 Sims give Ss access to paradigm labs that lead to building models. Google for plotting data to build graph&math models, #ngsschat

https://twitter.com/bmminj/status/690361782452555776

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classroom practices for an audience that is not always strictly defined, in a format that is easy to engage with, and in ways not limited to physical location, subject area, or level of teaching experience.

For those of us in school settings with fewer spaces for interaction with other teachers and administrators, our engagement in #teach180 is serving to document our practice and make it visible. In some instances, we are being approached by administrators who see the work we highlight in our classrooms and promote it to other teachers, administrators, and district leaders. In other cases, we are finding that our posts initiate conversations with our coworkers, who have sought us out to ask about specific posts. 2011 Fellow Sheila Orr noted,
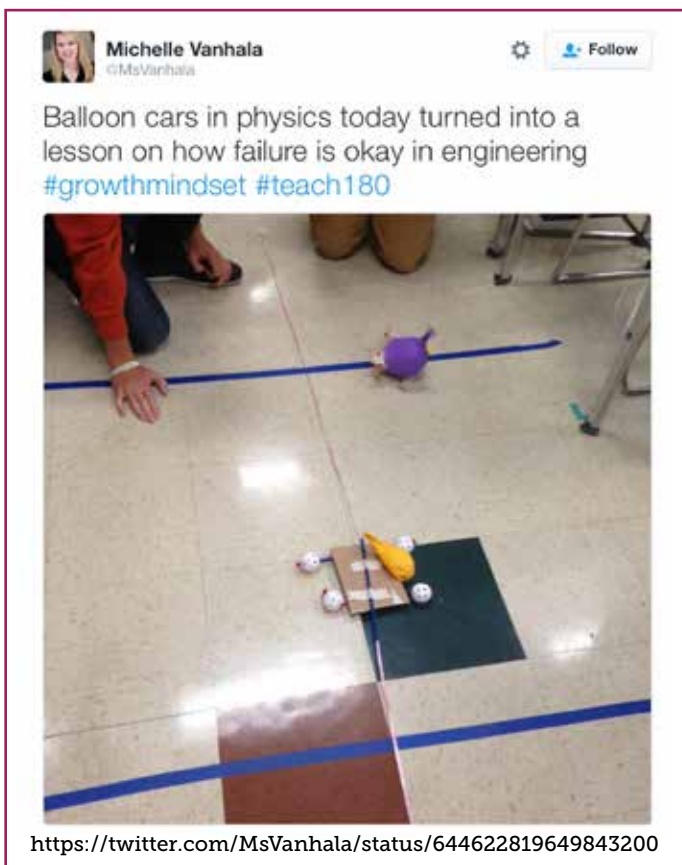
> After starting #teach180, my colleagues have started coming by my room and asking questions about what I am doing. Recently, a math teacher came by my room to ask about a group participation structure I used that she saw on Twitter. #teach180 has opened up opportunities for me to have conversations with my colleagues about group work that otherwise would not have happened.

Outside of our own school contexts, we are engaging in conversations about the value of inquiry, the place of direct instruction in the classroom, structures for classroom and student organization, and troubleshooting common student misconceptions with our colleagues and with #teach180 participants we didn't know. 2012 Fellow Sophie State reflected,

> Early in the year, my daily posts were noticed by another AP Biology teacher on the East Coast who also started engaging in the hashtag. She noted that we were essentially on the same pacing—we kept posting images of the same

This window into our own work is expanding our networks and relationships across states and content areas.

tasks just a few days apart in our AP Bio classes. The surprising connection allowed us to swap materials when she was doing something I was about to do and vice-versa. Because of the connection initially forged over #teach180, we were able to meet at the National Biology teachers conference in November (NABT) and share more ideas as well as connect ourselves to each other's networks.

https://twitter.com/MsVanhala/status/644622819649843200

This window into our own work is expanding our networks and relationships across states and content areas. We are discovering other educators working on similar tasks or with similar challenges with whom we are able to engage in collaborative discussion. We are no longer limited by our own educational networks as the hashtag is enabling us to find and follow others taking part in the conversation.

Windows into our own work can be both illuminating and difficult to provide, as many of us are discovering throughout this endeavo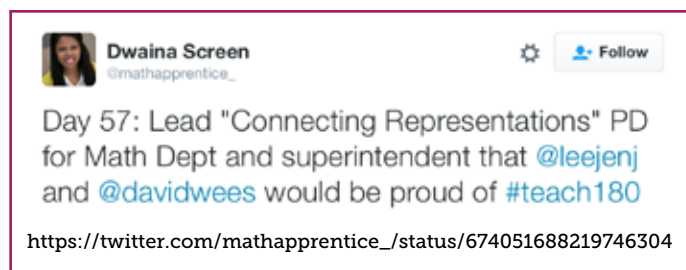r. We have been comforted by glimpses of honesty from the classrooms of colleagues and peers who struggle with similar classroom and pedagogical difficulties. Yet, we also are finding that opening up our practice through this format challenges us in ways that extend beyond the logistic difficulties of remembering our daily posts. We struggle some days to represent our work positively—after all, even for the most engaging of instructors, not all teaching and learning is gloriously successful, novel, or exciting. What if I'm not doing something "cool" today we wondered. Observing the posts of others sharing successes after a day of our own struggles challenges us to maintain a positive outlook on our own teaching and to use the opportunity to look for successes, rather than to compare ourselves with others. As 2014 Fellow Michelle Vanhala experienced,

> One of my first engineering projects with students felt like a disaster when the students' designs weren't successful in the limited time they were given. Sharing this insight on Twitter was both humbling and reassuring; as I reminded students the next day, failure is okay as long as we learn from our mistakes.

Just as we are experiencing the benefits of the broad Twitter platform in enlarging our collaborative community, we have been confronted by the dilemma of the undefined audience. How can we maintain privacy for our students and our schools in appropriate ways? Different school districts have a wide variety of policies ranging from no pictures and sharing of documents whatsoever to encouraging teachers to share their photos and student work to promote the school. Each of us have found our own way to navigate this complex issue, ranging from only sharing worksheets to just including the backs of students' heads.

We also question to what degree it is acceptable to engage in reflection about our own challenges considering that our posts are open to the view of our students and our administrators, who are also our evaluators. We are finding that the #teach180 platform is not a replacement for other forms of critical reflection, in which the norms of collaboration and expectations of trust are more defined. For many of us, this represents an opportunity to expand our own comfort zones in the face of these challenges; as we open up the window to our practice, even just slightly further, we practice

using our voices as early-career educators engaging in a larger discussion about teaching.

Dwaina Screen
@mathapprentice_

⚙ 👤 Follow

Day 57: Lead "Connecting Representations" PD for Math Dept and superintendent that @leejenj and @davidwees would be proud of #teach180

https://twitter.com/mathapprentice_/status/674051688219746304

TEACHER VOICE

From unifying educators across the country to showcasing points of pride, the #teach180 movement provides another outlet for "teacher voice." Currently, many of the conversations regarding education and educational policy are dominated by voices other than educators. Teaching is often cast as a profession that lacks complexity and rigor. For this reason, teachers using their voices to elevate the profession are more important than ever. In response to José Vilson's call to action, many of us considered employing social media to share and reflect openly on our practice as a way to activate "teacher voice." #teach180 also serves as a tool for us to showcase instruction that aligns with newly-adopted standards, like Common Core and Next Generation Science Standards, providing accessibility to teachers searching for resources. It also provides the public access to a pool of real classroom data to address and evaluate claims about implementation of new standards.
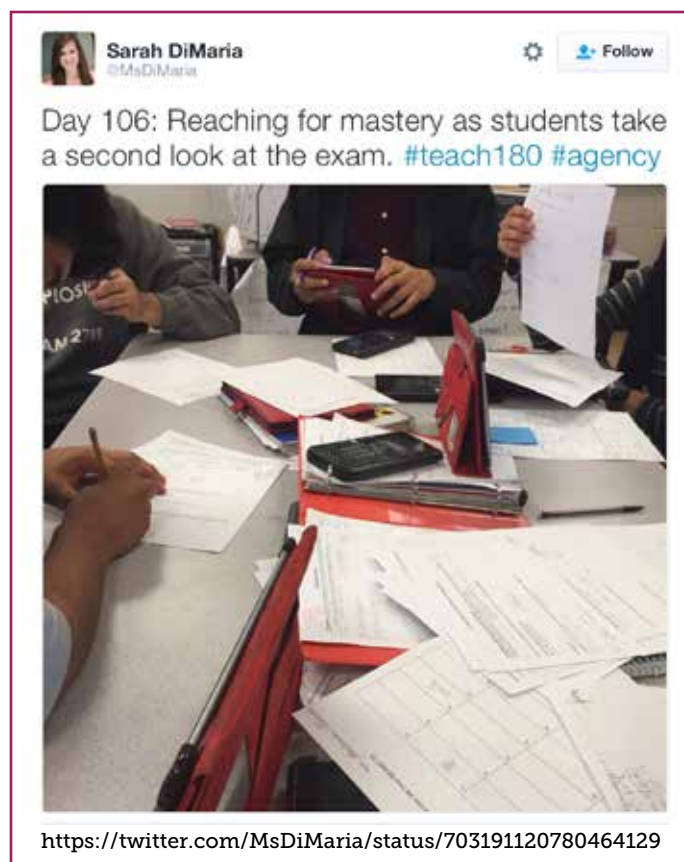
#teach180 provides snapshots into classrooms around the country to show that teaching is a career that is complex, intellectually demanding, and rewarding. Teachers know that teaching involves an intense amount of work from planning multiple classes to differentiating between a wide range of students and prior knowledge. By revealing different aspects of the job that often go unseen, such as the amount of grading that happens outside of school, the time when teachers enter or leave school and the work that teachers do even when they are not teaching on professional development days or the weekend, #teach180 teachers can use their voices to counteract the narrative of "teaching is easy." Arguably more powerful is #teach180's ability to show how complex and demanding teaching

is. Many teachers showcase summative tests and projects and the amount of work that they (and their students) do in order to show what they know. Other teachers share moments when their students made breakthroughs or persevered with a problem until the very end.

At the heart of all of this, we, as authors, are young educators trying to find our voice in the world. We chose Twitter as an entry into blogging and to share our stories. We have connected with each other, our students, coworkers, other teachers, professors, parents, speakers, bloggers, and policy makers nationwide. These connections have been made all through sharing snapshots, asking questions, peaking inquiry, reflecting, and sharing ideas from a simple 140 character message someone sent out through social media.
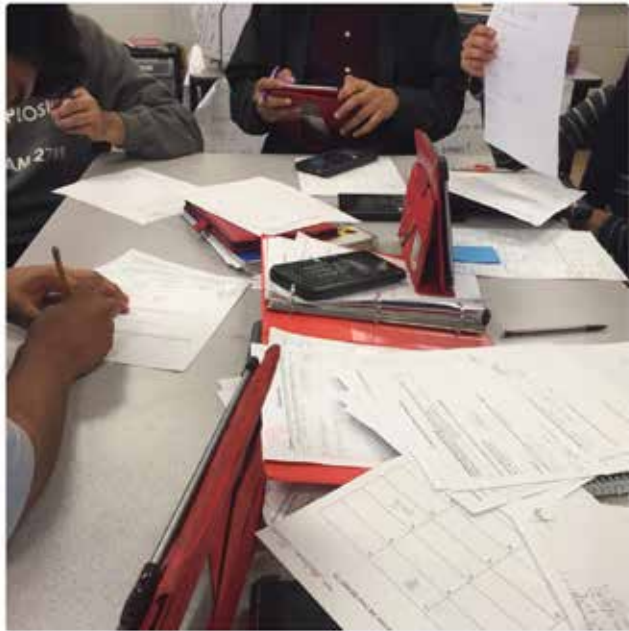
CALL TO ACTION
We hope that you will join us in activating and amplifying teacher voice by participating in #teach180. #CallToAction

Sarah DiMaria
@MsDiMaria

⚙ 👤 Follow

Day 106: Reaching for mastery as students take a second look at the exam. #teach180 #agency

https://twitter.com/MsDiMaria/status/703191120780464129

Each of us has taken our own journey this year. You have heard some of our motivations, challenges, consequences and successes as we have taken on this form of expression.

If you are an educator, we invite you to join us in sharing your classroom with a simple daily post ending in #teach180 or check out what we are doing in ours by searching #teach180 and commenting, liking, or retweeting. If you are not an educator, we invite you to help share our stories by searching and reading posts tagged with #teach180 and to ask questions, post responses, and retweet when you see exciting experiences happening in our classrooms. We challenge you to find your voice and share it. We hope you check out and participate in our #teach180 movement but above all find a way to share your story with others.

You do great work, and that work should be shared. Your voice should be heard. How will you get your voice out there? How will you share your story? We look forward to hearing it.

Stay up to date with us by following us on Twitter and searching the hashtag #teach180.

https://twitter.com/acstaffo/status/684150179847536640

https://twitter.com/MsVanhala/status/700424601688416257

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CITATION

THE POWER TO EFFECT CHANGE

BY HEATHER HOTCHKISS, CATHERINE STEINMETZ, AND DAVID STREIB

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INTRODUCTION

This story chronicles the experiences of three teachers—in three different schools, with three different levels of authority—who were working to improve student outcomes outside their individual classrooms. It is an exploration of teacher leadership, defined here as teachers seeking opportunities to make an impact outside of their classrooms. As teachers in their fourth and fifth years, Heather, David and Catherine started the year with a sense of having something to offer to their colleagues and school community. They felt that their work with each other and the Knowles Science Teaching Foundation was positively impacting student learning—they had evidence of this within their classrooms and felt it was a good time to push themselves beyond those (sometimes isolating) walls. They articulated this early on as seeking the "power to effect change," and later came to call this "agency."

Heather and David were given formal leadership roles within their contexts, so they started the year focusing on how to leverage those roles, assuming that agency was already theirs. Catherine was new to her school and not in a formal leadership role, so she started the year focusing on how to gain agency, assuming that she would have none to begin with.

What quickly became apparent was that these assumptions were wrong. Formal leadership roles may serve to help gain an audience, but that does not imply, as we learned, that one has agency or the ability to impact student learning beyond his or her classroom. This is because, ultimately, only the classroom teacher can directly impact the learning of his or her students. Agency to affect student outcomes for students outside one's classroom, therefore, must come from meaningfully collaborating with the teacher of these students.

Heather, David, and Catherine realized that their goal of expanding their influence on student learning would require the development of trusting, collaborative relationships with their colleagues. As the year progressed, these three teachers worked together on the same question: how do you gain agency through developing real collaborative relationships, within your context, regardless of title?

Interestingly enough, Heather, David, and Catherine saw three themes emerge that were instrumental in allowing them to find success in building this agency: a need for purpose; a need for clear

expectations; and a need to develop trust. Their hope in sharing this story is to highlight their experiences thinking about these themes as tools that can be used to develop as a teacher leader and to get the necessary buy-in to build agency on any scale.

MEET THE TEACHERS

Catherine is a middle school science teacher at a private, international school in Jordan. This is her second year at the school but her first year in the middle school. She does not have a formal leadership position but has found ways to work collaboratively with her colleagues.

Heather is a high school science teacher at a large public school in Virginia. She has worked at this school for four years. This past year (2014–2015), she served as the science department chair responsible for planning department meetings. Heather did not evaluate or supervise any employees.

David is a high school science teacher at a small charter school that serves both urban and rural student populations. He has worked at this school for four years and is now the lead math and science teacher. His responsibilities are to observe, mentor, and evaluate teachers in the math and science department, as well as act as a liaison to the administration. David is a first-level supervisor to many of his colleagues.

...Ultimately, only the classroom teacher can directly impact the learning of his or her students. Agency to affect student outcomes for students outside one's classroom, therefore, must come from meaningfully collaborating with the teacher of these students.

EXPLORING TEACHER LEADERSHIP

THEME ONE: A NEED FOR FOCUSED, MEANINGFUL PURPOSE

Teachers, as we all know, are busy. Planning, implementing instruction, and grading comprise more than a full-time job—on top of that, so many of us dedicate our personal/after school time to students, the community, and professional development. Consequently, when an administrator or colleague requests a meeting from a teacher who is already stretched thin, their natural response is often resistance ... avoidance ... frustration.

The inevitable time deficit that many teachers operate under is one major hurdle in establishing effective collaborative relationships. We know this to be true in our own lives and have certainly seen it in our colleagues' as well. That being the case, teachers who are seeking agency have to battle this time deficit and find ways to captivate their colleagues' genuine interest and attention.

Through our inquiry, we found that one effective way to establish working, collaborative relationships (that were not frustrating to our colleagues) was to ensure that the purpose of the working group was meaningful and clear and that each meeting had focus. David found this to be the case in working with the employees he evaluates, Heather in her department meetings, and Catherine with her planning team.

As soon as a meaningful purpose was clearly defined, our colleagues began to "buy in" to our work. Our collaborative relationships transformed, and we started to recognize our agency as the potential for influence outside our classrooms. Most importantly, the teachers within our groups felt that their work was validated and that their time well spent.

EXPERIENCES IN CONTEXT:

Catherine:

Initially it was easy to entice my colleagues to come to our lunchtime planning meetings, but as the first weeks of school passed and schedules became muddied, my colleagues' interests waned, as did their attendance. At this point, my approach and role within the group shifted. I took a risk and

decided that before our next meeting, I would set an agenda and prepare a draft lesson. To my surprise, this did not seem intrusive to my colleagues. Instead, they seemed to appreciate that our meeting had a tangible focus, even if it was one I had unilaterally set. We continued to operate this way as a team throughout the year—I had convinced my colleagues that our time would be meaningful and, in doing so, had gained agency in our little group.

Heather:

I started the school year with a vision for how powerful it would be if the science department would collaborate across courses. In my mind, the department meetings would be the lever to facilitate this. However, I became frustrated when some others didn't value the time in the same way and were not acting invested in the meetings. After surveying the department, I found that these teachers didn't feel like the meetings were a good use of time because they did not perceive the content of the meetings to be directly connected to what was going on in their classrooms. After many individual discussions, it became apparent that there was a common need for a clear set of expectations for the science learning progression from 9th to 12th grade. Therefore, we started to focus our department work on vertical alignment of science skills. Teachers have now been more invested in the

As a group, we gave each other the courage to take risks in our respective contexts, we supported each other in generating ideas, and, most importantly, we helped each other to prioritize being reflective in our interactions with colleagues in a way that we wouldn't normally do.

meetings and are holding real conversation about instruction, student potential, and the kinds of data we can use next year to compare outcomes of our shared plan.

THEME TWO: A NEED FOR CLEAR EXPECTATIONS ABOUT ROLES

Crucial Conversations: Tools for Talking When Stakes Are High (Patterson, Grenny, McMillan & Switzler, 2012) points out that an obstacle to clear communication is a belief that it is actually occurring. In our experience this year, we found that communicating expectations about roles was essential to finding success as a teacher leader. To do this, we had to understand what we felt our roles could be, and we had to clarify and communicate our roles to the group. Sometimes we needed to know what was expected of us (see David's experience), and other times we needed to communicate what others could expect from us (see Catherine's experience). If roles are misunderstood, a person's willingness and strengths may not be effectively leveraged and teams will not be working to their potential.

Recognizing the need to develop skills in communicating expectations, our group turned to the book *Crucial Conversations: Tools for Talking When Stakes are High* (Patterson et al., 2012). One of our biggest takeaways was the idea that clear communication requires a "shared pool of understanding" between people. Misunderstandings, therefore, usually come from missing information. Our goal then was to work on deepening this shared pool of understanding and eliminating missing information from within our groups.

Although this may seem like a common sense task, we discovered that, many times, our teams were operating without the clarity of a shared understanding, ultimately inhibiting our abilities to effect change.

EXPERIENCES IN CONTEXT:

David:

Being a teacher in a small school, I've played many roles this year. In addition to full-time teaching, I've been an instructional coach, curriculum developer, and supervisor for the other four math and science teachers. I felt comfortable as

an instructional coach and curriculum developer but was anxious about my role as an evaluator. What I saw in classrooms was mostly effective teaching. In spite of this, we were not meeting our accountability goal in terms of student success on state exams. Eventually, I was asked to answer a question that is being asked of school leaders with increasing frequency: "How is it that you wrote a predominantly positive performance review for a teacher who is not meeting the required pass rate?" This was an incredibly difficult question to answer. This teacher certainly had much to improve upon—any reflective educator does. But because we weren't meeting our test score goals, I had to make the change from coach to evaluator, and the unclear expectations surrounding my role as evaluator made this transition challenging. This raised some questions for me: How can we navigate possible differences between how teachers see their colleagues and how administrators see teachers? How do administrators and teachers come together to establish the criteria for effective teaching? How do colleagues and administrators judge whether or not another teacher is doing an "effective job?" My lack of clarity surrounding these questions really challenged my confidence to be an effective evaluator and establish a clear role as such.

Catherine:

As a teacher new to the school, I began the year with a sketchy understanding of how things got done and needed to quickly assess the situation. As I surveyed the department, I asked myself, "Who were the change agents? Who had agency?" What I found was disappointing; the teachers who had agency were those with formalized leadership roles. Additionally, I noticed that other teachers (like me) seemed frustrated with this structure, feeling as if our opinions and experience were not solicited as major decisions were being made. We felt locked out—but I came to realize later that our administration may not have known this. I was a new teacher who was not returning at the end of the year—maybe my principal assumed that I wasn't interested in getting involved as a leader. Of course, that assumption was wrong, but I had never made my expectations clear (i.e., there was misinformation in our shared pool of understanding). What I learned, ultimately, is that if a teacher is interested in becoming a leader,

the best approach is to be clear in that expectation —share it with your administrator, and share it with your colleagues so that they understand you are eager to engage in projects outside your classroom.

THEME THREE: A NEED TO TAKE RISKS TO DEVELOP TRUST

Trust is often cited as one of the most important prerequisites in establishing effective leadership. It is a crucial component in any relationship—whether that be between a supervisor and an employee (as in David's context) or between collaborative colleagues (as in Heather's and Catherine's contexts). Oftentimes, however, the importance and need for trust in working relationships is overlooked. Heather and David had assumed early on that trust was implicit in their titles but learned, almost immediately, that this was not the case.

Ultimately, we found that building trust takes time and was the result of positive interactions with our colleagues. Leveraging the ability to provide meaningful purpose (theme one) and clear expectations (theme two), we began to garner the trust of our teams. Nonetheless, as we write this story now, we acknowledge that our work in building trust is incomplete.

The difficult thing about developing trust is that it requires the leader to take risks. In Catherine's context, stepping out as a leader was risky in itself since her administration had not given her the authority to do so. Alternatively, Heather engaged in risk when she acknowledged that her original approach to department meetings had failed. David's risk was most significant and required that he engage in conflict that he would have otherwise avoided. We all found that these risks were productive, but we also recognize that there were many lost opportunities where we could have used risk to our advantage—in that sense, our experience with trust and risk taking is just beginning.

EXPERIENCES IN CONTEXT:

Heather:

My initial goal as department chair was to build trust among my colleagues in order to facilitate meaningful collaboration. I tried to start this trust-

building by asking members of the department to share why they teach and starting meetings with compliments and acknowledgements. However, I found that this kind of trust-building was superficial since we had not clarified why we were a group or what we needed to get out of our interactions with one another (focus/expectations). Real trust-building between teachers has started to come as we have engaged in shared work of creating a vertical alignment plan together. The teachers have started to trust me as I show them that I value their time and that we have shared goals. This has led to a developing sense of community in the department. Despite progress, I still feel like we are just scratching the surface of cultivating trust: we have not yet really begun to share our classroom practices nor have we had the real conversations about strengths and weaknesses that I believe would have the power to propel us from being a group of teachers in the same department to a team of teachers truly working together to improve outcomes for all of our students.

David:

My greatest point of learning this year has come from the realization that trust and clear expectations are inextricably connected. Due to unclear expectations in my role, I felt I lost trust from my administration and from my supervisees. My administration was losing trust in me because my evaluation appeared to be positively skewed when teacher test scores were not as high as expected. My supervisees were losing trust in me because I couldn't clearly articulate what was expected of them. Because we were not meeting test score goals, I was charged with holding teachers accountable for making changes that would result in better test performance. But what if teachers are improving—making positive changes that, upon observation, I can see make a difference for students; and the test scores still aren't at our goal? The answer to this question was murky, and this murkiness eroded people's trust in me, both as a supervisor and as an evaluator. This made me really want to explore further how teachers and administrators can develop trust by working together to establish criteria for effective teaching.

FINAL THOUGHTS: THE IMPORTANCE OF REFLECTION

Though we were investigating this question from very different contexts, we all experienced essentially the same major learning: agency (the ability to impact student learning outside one's own classroom) is only developed when a teacher leader establishes purposeful, well-defined, and trusting relationships with his or her colleagues.

Ultimately, it was our ongoing monthly reflection process that helped us get to this place. Each month we met virtually to engage in protocols looking at data like transcripts of conversations, surveys, and narratives. We used protocols like the "*Looking at Data*" protocol from the National School Reform Faculty in order to help drive our conversations deeper (Buchovecky). These data provided windows into our respective worlds. Through previous work together, we had developed norms like "hard on ideas, soft on people," which made it possible for us to simultaneously challenge the assumptions of those sharing their data and vulnerably share data that wasn't always flattering. Our structured discussions allowed us to notice the themes that arose in our work. For example, after we realized that Catherine was able to leverage "focus" with her group to get buy-in from her colleagues, Heather revisited the lack of meaningful focus in her department meetings. As David grappled to define his role as an evaluator, Catherine realized that she could have been clearer about defining what she thought her role could be with her colleagues and administration.

Through collaborative inquiry and reflection, we found that our experiences were not as divergent as we originally imagined. As a group, we gave each other the courage to take risks in our respective contexts, we supported each other in generating ideas, and, most importantly, we helped each other to prioritize being reflective in our interactions with colleagues in a way that we wouldn't normally do. Therefore, our final lesson and most important recommendation is that teachers seeking agency need to find one or more trusted colleagues who can act as true thinking partners as they take on the risky, yet rewarding, task of becoming teacher leaders.

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CITATION

TWO WEEKS IN TIBET (SORT OF): THE VALUE OF A CULTURAL EXCHANGE BETWEEN SCIENCE AND SPIRITUALITY

BY SCOTT STAMBACH

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Science is not only compatible with spirituality; it is a profound source of spirituality.

—Carl Sagan

I

"Oh, honey, that sounds amazing."

Only thing is nothing about her voice sounds too amazed. Actually, it sounds more like the mopey feigned enthusiasm that my mother typically employs when I tell her I'm about to do something she's decided will make her worry.

> "What?"
> "What *what*?"
> "You don't sound excited."
> "Well, honey, you know me. I get worried."

I had just told her that I was invited to India to be a part of a program established by the Dalai Lama himself. I told her that I'd be working directly with Tibetan monks to help teach them science and teaching methods. I informed her that I'd play a part in reshaping the legacy of Tibetan monastic education.

> And all she heard was: *India*.
> "Mom, can't you just pretend to be excited?"
> "I am pretending."
> "Not very well."

And then she says it—literally the most endearing thing I've ever heard come out of my mother's mouth: "But, honey, I just don't understand. Why do the monks need to learn science? Don't they just spend all their days praying to Muhammad Ali?"

II

How can we make the wonderful developments of science into something that offers altruistic and compassionate service for the needs of humanity and the other sentient beings with whom we share the earth?

—The Dalai Lama

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As adorably naive as my mother's question was, she actually has a point: Why do Tibetan monks need to learn science? How is it of value to a Buddhist monastic education that has done fine for hundreds of years without western science? Why would the Dalai Lama upend 1,500 years of Tibetan tradition and drag foreigners halfway around the world to train monastics in physics, biology, and neuroscience?

For starters, it's no secret that the Dalai Lama has had a soft spot for science since he was a young boy. Biographies and pop culture frequently depict the young Lama as a curious little guy playing with telescopes, taking apart (and then reassembling) watches, kickstarting generators to power old film projectors, playing with the engines of old Fords, and interrogating Western visitors who had any knowledge of science and technology. And once he assumed his role as the religious and political figurehead of the Tibetan community in exile, he began traveling abroad where he developed deep relationships with Western physicists and neuroscientists, like David Bohm and Francisco Varela. No doubt the Dalai Lama's curious and inquisitive nature and his openness to new ideas are two of his most famous qualities.

But could a soft spot for science alone be enough to inspire him to reshape the tradition of Tibetan monastic education? Or is there something more to his purpose and vision? Are there deeper benefits for Tibetan monks to reap from understanding the nature of science and scientific inquiry? And if Tibetan monks have the humility to consider what science has to offer their tradition, shouldn't we as Western educators and scientists reflect on what we can learn from *them*?

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III

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Today, make time to play.

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—Na'ama Yehuda

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It is the first day of class. There are two teachers leading the educational workshop via the Exploratorium in San Francisco, California: Tammy and Zeke. Both are high-quality people. On trips like these you never know who you'll get stuck with. Possibilities include the well-intentioned nerdy type who struggles desperately to connect with people or the education ego who talks relentlessly about "what happens in *my* classroom." Tammy and Zeke are neither of these types. Within minutes I wonder how I got lucky enough to get to work with these two educators. And as good as Tammy and Zeke are, they don't betray a trace of educational superiority. Something about them immediately sets me at ease, and I don't feel any need to prove my own ed creds when I'm in their presence.

So Tammy and Zeke are at the front of the room about to start their first session. They are going to deliver a clever lesson on water pressure designed to explore how we know what we know in science. It's a unique and humbling audience so I think maybe everyone was a little nervous. Not only are these real life Tibetan monks, but many of them are the leaders of the science centers at their monasteries. Thus, this workshop is geared more towards teacher education than science content.

Me, specifically, I was freaking out and I didn't even have to lead this lesson. I was thoroughly star-struck. Ever since watching the movie *Seven Years in Tibet* as a teenager, I'd developed a fascination with Tibetan culture and a pretty consuming crush on the Dalai Lama. I read everything I could get my hands on: *The Tibetan Book of the Dead, Freedom in Exile* (the Dalai Lama's autobiography), and tons of other Buddhist literature. And now, almost 20 years later, I'm in a classroom in India filled to the brim with Tibetan monks, in their traditional maroon robes, gathered here to learn about what *I've* dedicated *my*

Photo by Scott Stambach with permission granted by Science for Monks

life to—science education. This wasn't supposed to be how this worked. It was supposed to be the other way around.

But, so anyways, Tammy and Zeke are about to start their lesson. The translator at the front quiets the room. Tammy is about to open her mouth to start introductions. And then something really weird happens: *a cell phone* starts ringing. I of course promptly check my phone to see if it's me. It's not. Everyone's looking around the room to identify the culprit. Finally, one of the monks stands up and pulls out a blaring cellular device. He starts laughing. The room starts laughing. Other monks start teasing him in Tibetan. And as the room roared, I learned

Science explores the nature of reality through objective third person investigations, while Buddhists study reality through first-person subjective observations of consciousness in meditation.

my first two lessons about the nature of this group of students. The first is that if you think Tibetan monks are stuffy technophobes, you've got the wrong monks. In my two weeks in India, I saw monks pausing interviews to answer phones, monks pulling out their iPads to show me cool science articles, monks riding motorcycles, monks purchasing "Dark Fantasy" brand chocolate cookies, and monks sharing their top motion picture action hero (which apparently is Stallone, with Schwarzenegger taking a close second). The second lesson I'm learning is that these are some *playful* monks. They tease each other relentlessly and crack one joke after another, but it's all done in the most affable nature.

But here's the takeaway: As the lesson gets underway it quickly becomes clear that this playful attitude makes them the ideal group of students. They are the perfect audience for exploring pedagogy and testing out lessons because they have all the best parts of children (the curiosity, the wonder, the excitement, the openness to play) mixed with all the best parts of adults (the focus, the drive, the commitment, the big picture).

It reminded me of an analogy in physics education: When we first learn physics we often omit friction and air resistance in order to simplify problems and focus on the most basic and fundamental elements of motion. This is a perfect analogy for what it's like to teach monks, especially for a young educator.

Monks are a special audience in that they are highly intelligent, mature, curious, and thoughtful students. And at the same time they come into the classroom with almost no formal science instruction, much as our own high school students do. And what they do come in with is often a series of deeply held misconceptions, also much like our own students. Most of what Tibetan monks know of physics and cosmology comes from a Buddhist text called the *Abhidharma*, which teaches that the universe is a flat world with a square core mountain called Meru, surrounded by seven concentric rings of fresh water seas and lesser golden mountains. You can imagine how little they know of modern science and the tangled ball of misconceptions they walk into the room with.

So teaching monks is like learning to solve physics problems without friction or air resistance. All the key challenges of building knowledge in another human

being are present because the monks are so new to science learning. And at the same time the auxiliary challenges of education like low-engagement, issues of belonging, struggles at home, and immaturity aren't present. Teaching monks is like having a testing ground for mastering the basic pedagogy of a lesson without having to worry about the other challenges that disrupt learning. It gives us a vision of what the ideal lesson *could* look like, so that we can then reflect and build on it to meet the more challenging needs that arise in a high school classroom.

Or as Zeke put it: "If the monks don't get it, no one's gonna get it. So figure out what you're doing wrong."

IV

The Duality of One is the Unity of two.
                                                            —Joey Lawsin

Day 2: A monk saved me from a pack of rabid dogs.

Actually, they probably weren't rabid. And they probably wouldn't even bite. But they were scary, and I'm a bit dog-phobic so I was scared.

I was still jet lagged and woke up well before breakfast, so I decided to take a walk. At some point on this walk a pack of dogs start barking ferociously. An old Tibetan woman runs out of her house, picks up a handful of rocks, and starts hurling them at the dogs until they cower away. She starts walking down the street, victorious, while I turn around and start walking back, not interested in testing fate. Only thing is after a few more steps the dogs are back and barking louder than ever. The old lady notices and offers me her rocks with some hand gestures. I decline. But as I keep walking, the dogs get closer. And louder. And I get scared. So I cave in and pick up some rocks for myself. And as I wind up, about to pitch one, I hear, "No, no, no they won't bite."

It is a monk named Ngawang. He is the monk I'm most familiar with at this point of the trip because he is the lead science teacher at the Sera Jey Monastery where we're staying and he's been the guy to get us settled, make us feel welcome, and tend to our needs. He is a calm, soft-spoken man with gentle eyes. And as I look at him looking back at me about to throw a rock at a dog I feel a bit ashamed.

But there's zero judgement in Ngawang. He just explains the nature of the dogs here, which apparently is the nature of most dogs anywhere—all bark and no bite. So I'm mostly relieved, and now we have a nice walk back to the guest house where breakfast will be served. I use the opportunity to ask him about his experience of becoming fluent in science. He is one of a small cohort of monks who had the chance to attend Emory University for a few years and take college level science classes with the goal of bringing back that science mastery to his own Sera Jey Monastery. He tells me about how grateful he was for the opportunity but also that it can be hard and isolating building a science program at a monastery without the traditional supports you might get at a Western school or university. I then ask him why he feels like this work is important. What does it add to a monastic education? Why struggle through it when the inertia can be so great? In other words, I'm asking him my mother's question: Why do monks need to learn science?

His answer is straightforward and powerful. He tells me that the traditions of science and monastic inquiry aren't all that different. He tells me that they are both empirical ways at getting to the true nature of reality. Only the methods tend to be different. Science explores the nature of reality through objective third person investigations, while Buddhists study reality through first-person subjective observations of consciousness in meditation.

> "So you feel like learning science actually *reinforces* your Buddhist practice?"
>
> "Yes, I do. But it's deeper than that even. For example, Buddhism teaches us about the fundamental law of impermanence."

He's referring to the Buddhist notion of *anicca*, which ultimately states that all physical and mental formations that we believe to have enduring identities are actually in a state of constant flux and change. The Buddhists believe that one of the roots of suffering is attaching ourselves to objects which are inherently impermanent and without true substance. He continues:

> And even now modern science is teaching us that on the most basic levels of reality that nature is always changing and is highly

impermanent. That at the deepest levels of reality, things do not have a fundamental existence. There are many examples where science actually confirms the teachings of the Buddha.

There have been many books, since as early as the 1970s, which seek to find a convergence between modern physics and Buddhism. There is some controversy around these books, with some of the opinion that these authors have tried too hard to discover resonances between science and spirituality. But for Ngawang at least, these similarities clearly speak to him in a deep way. As if each contains the seed that completes the other.

V

Just as a goldsmith would test his gold by burning, cutting and rubbing it, so must you examine my words and accept them, not merely out of reverence for me.

—The Buddha

The Tibetan settlement we're visiting on this trip is deemed a "protected area" by the local state government. This means that all foreigners who intend to spend the night need to apply for a protected area permit (PAP). This sounds like it's probably a good idea for a settlement of peoples who have been through as much turmoil as the Tibetans have. Only problem is the local police station seems unnecessarily ornery about doling out these permits and no one quite knows why.

Nevertheless Tammy, Zeke, and I need to pile into a car and head down to the Bylakuppe police station to wrap up the paperwork required for our permits. There are foreboding hints that this might take a preposterous amount of time, but no one says it outright. We're escorted by a wonderful monk named Khechok (who I affectionately dub Ketchup after he explains that his name is pronounced like the condiment). There is something almost maternal

about him—maybe grandmaternal would be closer to what I'm getting at—despite being a 37-year-old man. He exudes a 24/7 concern for our well-being and comfort, and he's always trying to help in whatever ways he can. He also may be the most humble man I've ever met.

And so Khechok has all of our paperwork, all of our passport photos, all the things we need to get our permits wrapped in a nice bow, and he hands them over to the station. Two hours later we discover that what should be a quick 10-minute stamp might end up taking over three hours.

On the bright side, I'm able to get to know Khechok quite well while we're waiting. Among many other things I ask him a question that I've been dying to ask. It occurred to me that while science and Buddhism seem to compliment and even *confirm* each other, surely there are aspects of science that come into conflict with Buddhist beliefs. One quick off-the-cuff example would be their conceptions of the start of the universe. Buddhist texts claim that there is no beginning of time, because all material things require a cause. Modern cosmology, however, claims that there is ample evidence for a singular event—the Big Bang—that kicked off the universe. And from my experiences with my own culture, established religions' traditions often have a hard time accepting scientific findings that contradict their beliefs. So I ask him:

> "Khechok, what happens if science comes into conflict with one of your beliefs as a Buddhist monk?"
>
> "That would be fine."

I thoroughly did not expect this response.

> "It would be?"
>
> "Yes, of course. The ultimate purpose of both science and Buddhism is the Truth. So if some other method of investigation proves one of our beliefs to be wrong, then we would need to change that belief."

I was moved by this response. No doubt it takes courage to be able to let go of a deeply held belief when evidence seems to refute it. Especially since

[1]You can find information on the program at http://www.scienceformonks.org.

it is such a natural human instinct to identify ourselves with our beliefs. It also reminds me of something Bryce Johnson, the American coordinator of the Science for Monks[1] program, had said to me during dinner. "For these monks," he said, "there's no line between science and spirituality. There's just investigating reality. Sadly, in the West it seems you're required to pick one side or the other."

VI

Every giant leap for mankind resulting from a technological advance requires a commensurate step in the opposite direction - a counterweight to ground us in humanity.

—Alex Morritt

Today is Thanksgiving.

I've lived away from home for a long time. And I've never felt especially homesick on any holidays I wasn't able to spend with my family. But there's something different about this one. This time I'm *really* far away. Almost exactly halfway around the world. Which means we're in radically different time zones so *my* Thanksgiving is *their* tomorrow. Technically, I won't even *have* a Thanksgiving. I'm in India where most people don't even know it's a thing.

And so this time around I'm feeling homesick.

But as it turns out there's a loophole. Bryce decides to cancel classes this afternoon in order to hang Tibetan prayer flags and then indulge in a Tibetan feast on top of a restaurant in the middle of town—our very own *Tibetsgiving*.

And so now I'm watching these jolly monks climb trees and hang Tibetan prayers as high as they can get them, so the wind can blow those prayers out into the world, and in this moment there's no way my homesickness can live here. It's too rich; the vibe is too familial. In Buddhist culture there are three refuges to sooth monks through their toughest moments: The Buddha himself, the Dharma (the teaching), and the Sangha—the community of monks with whom you live. In this moment I can see why the Sangha is a precious refuge. The monks are a true family to each other. Their love and concern for one another is palpable. While immersed in this family, it's not possible for me to feel homesick.

There's something about being immersed in a community of monastics who have dedicated their lives to meditation and mindfulness that flips a switch. Their commitment to conscious and peaceful living is inspiring even to a hardline skeptic.

After we finish hanging prayer flags, we walk about a mile through rural Indian countryside to the restaurant. And soon I find myself deep in a conversation with a monk named Thabke. Immediately I feel a strong kinship with him. We start talking about his time at Emory University and the frat parties and beer pong matches he observed while he was there. We got into a deep conversation about the nature of pleasure vs. happiness. And we agreed that there are certain limits to the amount of happiness that can come out of extreme bouts of frat party sex, drugs, and rock and roll-based pleasure. He quickly segues into some lingering quantum mechanics questions he had for me, and as we bounce ideas back and forth I realize that this guy is really, *really* smart. Like somehow not getting a degree in physics did not put him at any disadvantage in this discussion. And when the conversation finally subsides I ask him why he thinks it's so important for him to learn science. Much as I expected he offers a perspective I hadn't heard yet. Thabke tells me that it is a way for Tibetan monastics to stay relevant in the modern world. "If we are to continue to attract Tibetans into monastic studies we need to be able to offer them a modern education as well as a spiritual one," he tells me.

> "Are you saying you're afraid Buddhism won't be able to excite Tibetan youth into monastic education unless that education modernizes?" I ask him.

> "Yes. How can we expect students to study in Tibetan monasteries when that education has little relevance in the modern world?"

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VII

Faith in the possibilities of continued and rigorous inquiry does not limit access to truth to any channel or scheme of things. It does not first say that truth is universal and then add there is but one road to it.

—John Dewey

It is Sunday.

After five days of intensive inquiry lessons (including but not limited to learning about neuroplasticity through distortion goggles, exploring air pressure through the three-holed bottle experiment, navigating marbles through mazes with nothing but breath, designing lessons and exhibitions via the 5E model of lesson planning, and a bazillion other teacher techniques) we finally get a day off.

Bryce planned an excursion for both the monks and teachers, first to a lake where we plan to picnic, and then to an elephant training camp called Dubare. Like most of this trip I hadn't any idea what to expect so I just rolled with it and waited cautiously to see what would happen next. I wasn't let down. Within minutes of parking at the lake, a soccer ball comes out, and suddenly we're playing a pickup game of soccer on a grassy knoll with about 20 monks. Robes are flying everywhere, sandals come off. And, as it turns out, the Tibetan monks take their soccer *very* seriously. Teams are made. Things get competitive. But as with everything else, it's all done with the most lovingly kind vibe (in spite of the elbows thrown).

Shortly after the game settles down, food arrives. We're talking pots of momos, which are like Tibetan pierogies (and for those that don't know pierogies they're basically Polish raviolis). Tibetans feel about momos how Americans feel about pizza. And it's easy to see why: They're delicious and addictive, though probably slightly healthier than pizza.

Once sufficiently stuffed, I start talking to Khechok and Soren, a Danish graduate student who has immersed himself with the monks to do research on the Tibetan diaspora. And so I ask Khechok:

> "Why do *you* think it's important for you to learn science?"

This is a sentiment that seems to recur again and again in my conversations with monks. There is an overwhelming sense that the Tibetan community is at a critical point in history. It is a culture that is caught between the forces of maintaining a rich and historic tradition (elegant maroon robes and solemn vows and rituals) while embracing the modern era and globalization (the iPads and motorcycles). And in a strange way, one gets the feeling that the movement for Tibetan leadership to implement science programs for monks is as much about cultural preservation as it is about modernization.

His answer also reminds me of a crucial point the Dalai Lama made in his book, *The Universe in a Single Atom* (2006). It is a book that explores the important relationship between science and spirituality. In it he observes that if Tibetans are to uphold their vow of service to the planet, then they are going to have to be literate and credible participants in the scientific debates that will help determine the future of science and technology policy. He admits to being very concerned about the ethical consequences of climate change, cloning, and genetically engineered foods. He also suggests that as remarkably important science is, it is often not tempered by ethics. And so if the Tibetan monastic community is going to have a place at the table in discussions that help shape policy, they need to be able to have a credible, modern, and relevant voice. And there's no way to do that without a strong foundation in scientific knowledge.

He pauses for a moment and considers my question.

> "I believe there are many methods of investigating the truth of reality. We can not be so proud as to think that ours is the only right way."

> "So you believe Western science has developed methods of understanding reality that might assist Buddhists in their own search for truth?"

> "Yes, I do. I mean look at all that modern science has discovered. This can't be ignored."

He tells me about the annual Mind and Life Conference in which the Dalai Lama brings physicists, cognitive scientists, psychologists, neuroscientists, and biologists from around the world to discuss how science is making progress in uncovering the secrets of consciousness. Then he adds:

> In the same way I think that Western scientists could benefit from studying within, and learning about consciousness that way. They can learn from our methods of investigation too. After all, it is the only way that consciousness can be directly observed— you can't do that with an EEG.

Then Khechok smirks at me with as close to a tongue-in-cheek look as a monk is capable of making.

VIII

In our country religion is not different from philosophy and religion & philosophy don't differ from science.

—Virchand Gandhi

The Tibetan monks I spoke with were humble and forthcoming about the benefits they received from studying science and the scientific method. So it seems important for the sake of this story to reflect on the ways in which Western educators and scientists can benefit from our working with *them*. Outside of their being the ideal students for testing out lessons and their supreme dedication to the search for truth even at the expense of their own beliefs, what can we as Western educators and scientists learn from teaching and dialoguing with Tibetan monks?

Perhaps the most poignant answer comes out of the story of the guy who's worked with these monks the longest. Just before Bryce started coordinating the Science for Monks program, he was wrapping up an M.S. in environmental engineering at the University of California, Santa Barbara. As he got closer to the finish line he started to become disenchanted with science. He felt that in spite of all of science's triumphs, it didn't really teach us anything about how to be a good person and live a good life. He said that in many ways, for all its successes, science had nothing to say about the stuff that *really* matters.

And so one day he was sitting in the office of his Religious Studies professor, who had just received a letter from the office of His Holiness the Dalai Lama looking for someone to start up this program where Western teachers teach science to monastics. The professor, who couldn't accept the invitation because he was knee-deep in his quest for tenure, looked up and said:

> "Hey Bryce, wanna teach Tibetan monks in India?"

And so started his 15-year journey coordinating the Science for Monks program. While he never had any intention of donning maroon robes, he thinks that building relationships with this community and immersing himself in its culture has given him something that science never could—a different take on how to live. And when you watch the playful way he interacts with the monks, it's obvious. He is genuinely happy in their presence, and it is equally obvious that they've grown to deeply love and respect him.

I was only in their presence for two weeks, and I felt a bit of this transcendence. There's something about being immersed in a community of monastics who have dedicated their lives to meditation and mindfulness that flips a switch. Their commitment to conscious and peaceful living is inspiring even to a hardline skeptic. It was rejuvenating, and to be honest, something I felt I really needed, professionally-speaking. The job of education is no doubt one of the most demanding jobs there is. It is no secret that stress-related illnesses and even alcohol abuse correlate with the stresses of teaching. And while there's some debate over the exact numbers, some studies show that as many as 50% of new teachers leave the profession within the first five years.

At the same time, another swath of modern psychological research has confirmed the healing capacity of practicing mindfulness, both in meditation and in daily life. Working with these monks, it is clear that this deliberate, aware, and non-judgemental stance towards life is healing in and of itself. In my two weeks in India, I worked hard to find a monk or nun who came off as impatient, frustrated, irritated, or bored while I was at Sera Jey monastery—I couldn't.

Of course, they are still just men and women. They are not gods. Conflicts do arise in the community. Egos can flare. But on the whole, the nature of these men and women is ebullient, light, playful, patient, and perpetually curious. The experience of working with these monks would invite even the staunchest naysayer to consider the benefits of a more mindful lifestyle. No doubt working with these monks and nuns is a window into another way of being. It offers some confirmation that there are lifestyles and attitudes towards living that can nourish health and peace of mind.

Or as Tammy put it whilst we waxed about the peaceful vibe emanating from these monks: "I want some of *that*."

IX

In the backdrop of all these benefits there looms the thing that I find to be the most important thing we stand to gain from working with these monks

Ultimately, it reminds us that when we educate our next generation our purpose is bigger than simply passing on the legacy of Newton's Laws and Punnett squares. We are training those who are next in line to take care of our planet and species.

and nuns. It is the insight that working with this community is a poignant reminder that *our role as educators and scientists is so much bigger than merely teaching content and discovery*.

What do I mean by this?

Upon ordination, every Tibetan monk makes a pledge called the Bodhisattva Vow. It is basically the monk/nun version of the Hippocratic Oath. Except that the Bodhisattva vow carries with it a solemn obligation that infuses the entire life and identity of the monk. Actually, it would be more true to say that it is intended to infuse countless lifetimes.

The Bodhisattva vow is a pledge to devote one's entire existence to alleviating the physical and psychological suffering of all sentient beings. As such, every action taken by a monk carries with it the spirit of this vow. No deed is done without (ideally) first considering its immediate impacts on all of humanity and sentient life.

When the Dalai Lama established the Science for Monks program in 2001, one of his primary reasons was his belief that Western science could stand to learn something from the Buddhist focus on altruism. In a world filled with an underlying anxiety about technological woes like climate change, genetic modification of life and food, cloning, artificial intelligence, heightened isolation through entertainment, and what seems to be a growing pathological dependence on technology, the Dalai Lama saw an important opportunity to bring a spirit of ethics and altruism to the pursuit of science.

I say all this because it defines the purpose and spirit with which the monastics in the Science for Monks program approach learning. These monks are here to learn science not simply to understand reality, but also *to serve humanity*. And there is no way to work closely with and educate these monks without that spirit and intention seeping into your own practice. Ultimately, it reminds us that when we educate our next generation our purpose is bigger than simply passing on the legacy of Newton's Laws and Punnett squares. We are training those who are next in line to take care of our planet and species.

I'm of course not suggesting that there is no merit to science for its own sake and that we all need to throw

on a robe and start saving the world. But I do believe that because the scientific method has worked so well, and because for so long it has been the pursuit of Truth most grounded in reason (at least in the West), an arrogance has grown around it. It seems to me that science in its pursuit of discovery and progress above all else has lost its ethical compass.

Maybe it is more true to say that it is *us* as a society in our methods of using and exploiting the truths uncovered through science that seems to have gotten lost. Maybe there's a far more collective responsibility for the vessel with which we carry the fruits of science. But either way in a world where every major threat to the survival of our species is science or technology-based, it seems more important than ever to teach our youth in a way that makes them feel marrow-deep the responsibility that we have both as scientists and as citizens of our planet. And I know of no better reminder than living in dialogue with a community of men and women who have committed their lives to this very purpose.

X

The work of the heart is never done.
—Muhammad Ali

It is the last morning of my stay at the Sera Jey Monastery.

I'm eating one final breakfast in the guest house with Tammy, Zeke, Bryce, and our class of monks. It feels bittersweet, like I'm about to walk away from something I'll always want to relive again for the first time. And to add to the already emotion-packed moment, Bryce calls me up to the front of the dining hall and decides to make the goodbye a public one. He hands me a satchel filled with gifts on behalf of the monks, wishes me safe travels, and welcomes me back to teach in the future. I'm typically very uncomfortable with one-person goodbyes, let alone goodbyes in front of a room packed full of monks. So I just tell them, via our translator, Karma, that it was an honor, and they'd all better be better teachers than me by the next time I come back.

Outside there is a taxi waiting, and half the monks hang back to see me off, even though it means being late for their first class of the day. Then I say a second, and then a third, goodbye, before getting into the car.

•••

When I get to my hotel in Bangalore, I call my mother to let her know that I survived India.

"Glad to hear, Bud. How was it?"

"Just like you said."

"Yeah?"

"Yeah."

"So what'd you do?"

"Ya know, we spent most of our time venerating heavyweight champions."

"*Not* funny."

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