

PEER-LED TEAM LEARNING SUSTAINABILITY

THE GIFT OF ACTION TO THOSE WHO WOULD FOLLOW

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Editor's Note: Ms. Narum first read "A Frog Journey: A Cherokee Tradition" as the introduction to what follows.

Why start with the story of the Frog and the Coyote?

For three reasons:

- First, that everything that I might think of saying about the why and the how of pedagogical change you already know—you are the choir, a distinguished and experienced choir.
- Second, that by starting with such a story, I have an opportunity to illustrate how stories are really at the heart of PKAL, in particular stories that say something about leaders and leadership.
- Finally, that over the past several months I have been reflecting on the why and the how of Project Kaleidoscope as we have evolved over the past twenty years, in the context of thinking about the transition into the next twenty years of PKAL...and thought some of my reflections might be of interest.

Some of you may know Karan Watson, Executive Vice President For Academics & Provost at Texas A&M University—the story of the frog journey is a Cherokee story she related at a PKAL workshop on leadership in organizational change. In considering what I might add to a discussion of national PLTL leaders, this story came immediately to mind. I see it as a story about mentoring and peer-led learning. (I will leave it up to you to determine if the coyote and a frog are peers).

Some of you may know the Cherokee tradition, that stories are not interpreted by the one who tells, rather by the one who listens. However, here are some questions Karan posed to us, her listeners, at the PKAL workshop on leadership:

- “Have you remembered that it’s very important to communicate, to find a song that is pleasant to all your brothers and sisters so that you all can keep in mind the same end?”
- “Have you remembered that action is important, and even more important—as a leader—than your action is being able to inspire and motivate and give the gift of action to the others who would follow you?”

This is what I sense is at the heart of the PLTL community, that you are giving the gift of action to those who would follow you.

Her words and questions also challenge us to think about the power of stories, so I beg your indulgence in sharing some personal PKAL stories—not quite myths, but about a song that I hope will be for all of us a pleasant reminder that we all have the same end in mind and why we are all involved in doing this hard work, engaged in this long journey of pedagogical and institutional transformation.

I have found, over my years with PKAL, the power of listening to the stories of people who care deeply about their work and who are making a visible and sustainable difference. Then, in my private mulling, I try to distill some overarching lessons to be learned from stories of people in different settings, circumstances and communities.

I have different kinds of stories; let me begin with these learning environments for undergraduate students in science. Sometimes I try to catalyze the story telling with a question like this:

If visitors were to come into your classroom or lab—the environment in which your students are learning—what impression would they leave with?

A response from Tim Lewis, PKAL F21 and biologist at Wittenberg University:

“I would hope they would see a community of learners all working with the material to gain a better understanding of it. I think of myself like *Old Today*, the Shoshone Indian guide who brought Lewis and Clark through the treacherous, confusing parts of the Rocky Mountains. He got them lost a few times, but together, with his knowledge of the area, they got through.”

“My classes and labs are like that. I know the area (the materials), but I don’t know every part of the place. I bring an expertise, but not all the answers. My students work with real-world ambiguity...and in the end they learn a great deal about testing and experimenting. I don’t teach the same way each year, because each class shapes its own route through the process of the journey of learning.”

A response from Terry Favero, PKAL F21 biologist at University of Portland:

“They would see that the learning for my students is designed following the pattern of structured chaos which often mirrors the pattern of neural networks. I would like visitors to sense that I’m trying to pry into the mental models my students have about learning. I’d like them to see that *my* mental model of the classroom is something like a department store dressing room—where we are taking clothes/ideas to try them on, examine them, see how they fit, why they fit (or not)?”

“So many new scientific ideas are imperfect or not completely understood. So, to carry the analogy forward, I am asking my students: ‘when is it okay to buy a pair of pants that fits in the waist, but is the wrong length?’ It is important to ask that question, because that is the world that we live in.”

A response from Robert Beichner, physicist from North Carolina State University:

“Their impression would be that the learning space looks more like a restaurant than a classroom, or perhaps more like a banquet hall, because there is much noise from the visibly engaged students. Our challenge in redesigning the program (what became SCALE-UP) and the space for introductory physics was to achieve an environment that would promote the kind of active learning we wanted for our large enrollment classes.”

“What the visitor would see is the realization of our idea that social interactions between students and with their teachers is the 'active' ingredient that works for us. They would see nine students at a 7' diameter round table working in groups of three or collectively as a table-group of nine. The faculty present interesting scenarios from the world of physics for students to study and then they roam around the classroom, working with individuals and with teams, engaging them in Socratic-like dialogues.”

If this were a normal PKAL event, now would be an appropriate moment to pause, to ask each of you to reflect on these questions, to engage in a think/pair/share exercise with colleagues here:

What would a visitor to your peer-led team-learning environment come to appreciate and understand about the process and context and journey of learning that happens when you and your students come together?

Could you describe the different kinds of environments—affective as well as physical, social and intellectual—that you are shaping for your students?

Such a time of reflection would honor the Cherokee tradition of persons making their own meaning out of experiences shaping their lives.

Another set in my personal quiver of stories comes from formal and informal interviews with people I've met along the way. It has been a remarkable personal, twenty-year journey in which I've begun to figure out how people (agents of change like you) manage to carve out time to be pioneers, to champion and to take responsibility for leading meaningful change in the undergraduate STEM learning environment. I've learned from pioneers at all career stages, in institutions of all types, and from every one of the STEM disciplinary communities.

To emphasize that mature as well as rising leaders have thought deeply about their roles and responsibilities as leaders, here are some words of wisdom distilled from interviews I had several years ago with some recipients of the National Science Foundation Distinguished Teaching Award. My public intent in interviewing them was to capture advice for rising leaders within the PKAL Faculty for the 21st Century community, but I have also taken them to heart in shaping my personal journey.

Many said something like this:

- “One of my best post-doc mentors took me aside and asked: ‘when you are on your death-bed, is it more likely that you will wish you had written another few papers or had spent time with family and friends?’ So, don’t be consumed by professional pressures, but make your own path—write fewer but stronger papers. Whatever inspires you—do it! You will bet your reward will come from all the lives you touch. My favorite scientists are also excellent human beings.”
- Other advice: “Aim-high; whatever you do, do extraordinarily well.” “Know the rules.” “Make a plan and stick to it.” “Learn to say no.”

Knowing how to say ‘no’ is a lesson that J.K. Haynes (Dean of the Division of Science and Mathematics at Morehouse and PLTL Conference Host) has learned well. We have worked together for almost the entire time of PKAL, and he is one of the few people (who I still love and admire) who has said ‘no’ to me—and survived.

In this, and so many other ways, J.K. has been like a mentor to me. I have even begun to learn how to say ‘no’ to people, realizing all the time the difficulty in balancing a conflict between doing something important in the larger world and trying to do what I am already doing—and trying to do it extraordinarily well, without getting too frazzled.

My interest in seeking peoples’ stories is in part because I am a very curious person, but it was through reading *Creativity*, by psychologist Mihaly Csikszentmihalyi, that it came home to me how powerful individual stories can be in the process of shaping agendas for action, both personal and collective agendas. In retrospect, this approach is the very DNA of Project Kaleidoscope, because our visions of *what works* have emerged, in every instance, from the stories of leaders—individual and institutional. Some PKAL history:

The question posed to the initial cadre of PKAL leaders (1989 – 1990) was:

What were your experiences as an undergraduate learner that motivated you to become a chemist, biologist, mathematician, ...?

The context for asking that question then (in the early 1990’s) was the drastic, well-documented and well-publicized attrition of declared and potential science and mathematics majors during their first or second year as undergraduates. We realized that to understand how to get students as passionate about science and mathematics as the people around the first PKAL table, we should gather their stories. Looking through the lens of the frog journey, common throughout each of their stories is the power of communities in which their faculty mentors saw them—as students—as partners in learning and thus gave them every opportunity to gain the confidence that they could become a chemist (a practitioner in their field of interest) and could succeed.

Again, if we had time, it would be valuable to stop for a time, and replicate that early PKAL experience in order to determine how closely your collective experiences mirror those of the early PKAL community of leaders.

Csikszentmihalyi, in his research and writing on creativity, was seeking over-arching truths about the creative person. His interview questions included such as these:

- Of the things you have done in life, of what are you most proud?
- Of all the obstacles you have encountered in your life, which was the hardest to overcome?
- Has there been a particular project or event that has significantly influenced the direction of your career?
- If there has been a significant person (or persons) in your life who has influenced or stimulated your thinking and attitudes about your work (could you talk a little about this)?

From the answers to these questions, he arrived at findings that are clear evidence of how asking the right questions, how gathering the stories of people you meet along the way can (in his words) “make our own lives directly more interesting and productive” and suggest ways “for enriching anyone’s everyday existence.”

In our work in PKAL, we see the power of stories in helping people realize that they do not have to personally reinvent solutions to every problem they are facing. The importance of reducing time and energy and frustration spent in starting reforms from scratch was emphasized for the early PKAL leaders by Uri Treisman (then and now a national icon in the community of STEM agents of change). In his words:

“We need leaders who recognize that that for every hard problem there is already a beautiful solution somewhere and that solving problems locally is not an efficient, cost-effective or sustainable practice. We need leaders who persistently ask:

“What can we learn from those who have solved particular problems in particular environments to advance the process of reform within the communities of which we are a part—communities within disciplinary/interdisciplinary fields, individual departments and/or at the campus level?”

This, of course, is why you have gathered at this national conference on peer-led team-learning. You are here as a community that has direct experience with both barriers and solutions, with what works and what does not. My impression of the PLTL community is that you have taken to heart Treisman’s challenge to leaders. But, I challenge you to be more aggressive as disseminators, as story-tellers. Your story is compelling and needs broader attention. So, I am encouraging you to identify two or three key questions that have emerged from your collective work, probe for answers to those questions from the coyotes and foxes within the PLTL community, and promote wider discussion of your distillation of the answers coming back.

Here is one example from the PKAL experience of the value of such a process of asking questions and sharing answers.

Leaders of the Greater Philadelphia Math Science Partnership had invited me to facilitate an early meeting of representatives of the forty schools, colleges and universities involved with that MSP. Like all nascent collaborations, these were people not used to working together; they were from different educational contexts so had no shared language or culture. So, we adapted the implicit *Creativity* question and gave this charge to participants, as a pre-meeting assignment:

Identify and interview someone in your world who clearly knows how to build collaborating groups that engage people with little common experience in working effectively to tackle a significant issue or capitalize on a significant opportunity.

We then spent the first hour of the meeting in sharing and extracting common wisdom from the individual reports back. One college physics faculty member had interviewed the volunteer leader of the Greater Philadelphia Youth Soccer league, arrived at these words of wisdom:

- “Establish a core leadership group that includes the most forward-thinking people in the community.
- Celebrate; celebrate; celebrate. Do team-building exercises.
- Brainstorm; brainstorm; brainstorm. Don’t focus on obstacles; ask instead—if there were not obstacles, what might be accomplished?
- As a leader, deal with everyone with respect and enjoy doing what you do—and let others see your enjoyment. Your positive energy becomes contagious.”

Those insights reflect our PKAL experiences and I am certain, those of your PLTL community about shaping meaningful and sustainable collaborations.

But let me here turn again to Csikszentmihalyi, whose stories are about the *personal* opportunities one might have to lead a fulfilled and creative life. From his analysis of interviews he had with almost one hundred individuals (from Mortimer Adler to Rosalyn Yalow), he arrived at advice, such as this, that would add value to our own personal frog journey:

- Try to be surprised by something every day.
- Try to surprise at least one person every day.
- Write down each day what surprised you and how you surprised others.
- When something strikes a spark of interest, follow it.
- If you do anything well, it becomes enjoyable.
- Shape your space.
- To keep enjoying something, you need to increase its complexity.

Again, no time to pause, but try to remember something that has surprised you today. Try to plan time in the next few days to ask yourself the questions that Csikszentmihalyi asked in his study: *what are the experiences that have most influenced you in your life?*

A favorite personal PKAL story is this, one that has certainly shaped how I have come to think about my work with PKAL.

During the celebration of the new science facility at Wittenberg University, I met the keynote speaker, Elwood Jensen, who was a Wittenberg alumnus and who, as some of you might know, was a pioneer in developing the drug tamixofen. (It is interesting to note in his wikipedia citation how he uses the metaphor of the journey for his work):

“Dr. Jensen's landmark discovery of hormone receptors-which earned him the honor of being the "father" of the now burgeoning nuclear receptor field-has had a major impact on the treatment of breast cancer....

During the 1950s, when Dr. Jensen was doing his work in Chicago, investigators had been focusing on estrogen's influence on the enzymes involved in biosynthesis. Dr. Jensen, however, took a different approach. As he puts it, it was like the early European mountaineers who decided to climb the Matterhorn (which he himself once did) by what at the time appeared to be the most formidable face-only to discover that it was the better way to go. His approach took him to the scientific summit.”

With the two of us alone for breakfast in the faculty club, I asked him a *Creativity* –like question:

“Looking back, of all the things you’ve done in your life, of what are you the most proud?”

Without a pause, he responded:

- I was asking new kinds of questions, questions that no one else was asking.
- I knew how to build a collaborating team in the pursuit of answers to those questions.
- I was persistent, even in a time of little support and lots of skepticism within the community.
- I’ve made a difference in 100,000’s of lives.
- I’ve had fun all along the way.

My pretty well-in-tune antenna suggests that answers from the PLTL community would mirror his answers, if I were to pose the same question to you. Perhaps I’ll be even bold enough to suggest that his answers are similar to those that might be given by the increasing numbers of pioneers undertaking the frog’s journey toward a more desired future for undergraduate STEM learning.

Peer-Led Team Learning – Sustainability: The gift of action to those who would follow. Jeanne Narum – 2012, www.pltlis.org

Let me close by telling you some of my story—some answers to this question, which I have been asking myself a lot lately:

“Looking back, what are the key lessons learned through your work with Project Kaleidoscope?”

In doing this, I see myself more as a coyote than the frog.

Lessons learned:

- The power of intentional mentoring—particularly in the process of nurturing the next generation of leaders and in helping them soar.

Several years ago I surveyed some PKAL campuses, asking both deans and faculty what works in building a culture of risk-taking. Two memorable responses from Barnard College—each sent individually. The dean, Liz Boylan, said what was important was hiring the right faculty from the start and giving them space and time and resources to play around with new ideas. The faculty member, Stephanie Pfirman, PKAL F21—head of environmental sciences at Barnard, responded: what was important was having a dean who supported, recognized and celebrated faculty curricular and pedagogical explorers.

These responses from Barnard colleagues mirrored those of Bruce Alberts (former NAS president), speaking at a PKAL meeting in the mid-1990’s on “what I learned about catalyzing change:”

- “That “naïve” young intellectuals are critical in pushing the system into the future.”
- “Provide enough rope; give small groups of faculty the flexibility to make changes and revisions in their domain of responsibility.”

The responses from Boylan and Pfirman are also reflected in the advice from Hans Finzel, in his paper, *The Top Ten Mistakes that Leaders Make*:

- How to encourage the true mavericks: give them a long tether; they need space to soar; put them in charge of something they can really own.
 - How to discourage the true mavericks: keep looking over their shoulders; put them on a team full of small-thinking bureaucrats.
- I have also come to understand the power of intentional and informed leadership, when each individual has figured out the role she or he would like to play and could best play in the process of change. The people I see making a meaningful difference are intimately aware of their own strengths and limitations. They are people, to use words from Max DePree, who have found their own voice as leader.

When I survey the PLTL community through the PKAL lens of *what works* in change, I hear these words, from Michael Fullan, in his work on *Change Forces*, resonating:

“It is only by individuals taking action to alter their own environment that there is any chance for deep change. ...what drives [those intending to make a difference] is moral purpose, but moral purpose by itself is not good enough. Moral purpose needs an engine, and that engine is individual, skilled change agents pushing for changes around them, intersecting with other like-minded individuals and groups to form the critical mass necessary to bring about continuous improvements.”

- I have also become convinced that leadership is most powerful and meaningful when it focuses on students and student learning in the process of change. In her analysis of characteristics of successful STEM education innovators at the University of Wisconsin, ethnographer Susan Millar concludes:

“In contrast to faculty who consider teaching a burden, successful innovators feel genuinely excited about students and teaching. They enjoy seeing their students learn and take pride in the accomplishments of their students.”

Insights that allow us to loop back to the work of the early PKAL leaders, that what works is when faculty see students as partners in learning.

- Finally, I have learned the importance of leadership that is contextual, whether the context is institutional, scientific or societal. Again, words of wisdom from Uri Treisman:

“The lessons for leaders is that at the same time as projects continue to evolve, the internal and external environments also change. Everything is volatile; leaders have to monitor and respond to such changing environments to ensure that innovative solutions do not have short lives. It is the responsibility of leadership to capitalize and leverage reforms and to support the work of innovators on their campus by signaling that the results of working together can be sustained. Visionary leaders generate such a community.”

In my personal times for reflection during this time of transition, I am wrestling with the changing context, considering what new kinds of patterns will be emerging in our collective efforts, as visionary leaders, to generate such a community in which we are each supported along the journey, and, like the frog, have learned to be giving and sharing members of the communities of which we are a part.

So, here is where I am, trying to weave a relevant and contextual roadmap for the next stages of our journey. I am trying to connect the lessons learned in four different domains, the worlds of those who think about research on learning; of those who think about leadership teams in learning environments; of those engaged in the practice of 21st century science, technology and engineering; and of those taking leadership responsibility to make something different happen. I see parallel themes and emerging patterns (think kaleidoscope):

- A brief definition of how people learn best is that it happens when: learners are actively engaged; situated in a social and supportive community; given opportunity to reflect and build on prior knowledge; are involved with addressing problems relevant to their lives and work; and when they become deeply and personally engaged, understanding their particular responsibility within a larger community of practice.
- From the work of engineering educator Karl Smith, I have come to a better understanding of the power and potential of leadership teams, that *what works* is when there is:
 - Shared leadership
 - Individual and mutual accountability
 - Specific goals that have been set and are pursued by the team
 - Collective responsibility for the outcome

- Collective engagement in discussing, deciding and doing.
- From my friend Jim Gentile, now president of the Research Corporation, and long-time PKAL leader, I have learned how to describe what 21st century STEM practitioners do, and thus what students will need to learn to be able to do. Listen to these verbs, and think about the earlier depictions of what a 21st century STEM classroom looks like:
 - Canvass; design; experiment; question; act/realize; listen; imagine; brainstorm.....and more.
- From literature on the theory and practice of leadership in change, I have come to look at the leaders within the PKAL community through a lens of innovators and inventors, understanding (as outlined in a paper from the MIT Lemelson Program (and reflecting insights from *Creativity*) that these leaders share the common personality characteristics of:
 - Resourcefulness
 - Resilience
 - A commitment to practical action
 - A high tolerance for complexity and ambiguity
 - An ability to embrace failure as a learning experience
 - The capacity to match their personal talents to addressing the problems/opportunities confronting them

Recognizing my intent to honor the Cherokee tradition, I put these four threads on the table for your further mulling, and ask only: is there a way that we—as a community, can capitalize on the parallel relationships between nurturing 21st century learners, nurturing 21st century STEM practitioners, and nurturing 21st century leaders?

Many more personal and private lessons learned, but let me end with saying this has been a remarkable and unexpected journey, collaborating with colleagues with a shared passion for students and student learning, a collective commitment as leaders to making a difference, and a community that continues to celebrate, with Elwood Jensen, the importance of having fun all along the way.

So, I'll end with the question from Karan Watson: “what is your frog journey?”

Editor's Note: This article is based on a presentation at the PLTL conference at Morehouse College, Atlanta, GA (Nov. 13-14, 2009). Jeanne L. Narum is the founding director of Project Kaleidoscope (PKAL) located in Washington, D.C. A nationally recognized advocate for undergraduate education, PKAL activities reflect her commitment to ensure undergraduates—no matter their background or career aspiration— have access to learning environments that equip them to be tomorrow's leaders. For more information, please go to <http://www.aacu.org/resources/sciencehealth/kaleidoscope.cfm>.

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