



Recognizing  
the complex  
transition process  
from teacher  
preparation to first  
year teaching

## Transforming Teacher Preparation Through Partnership: Leveraging Improvement Science to Support Teacher Induction

*Tanya Flushman, Sarah E. Hegg, Megan Guise, and Laura Flessner*

### **Abstract**

Teacher preparation programs and school districts annually invest significant personnel and money to support cohorts of pre-service teachers and new first-year teachers. Despite this support, the transition from teacher preparation to the first years of teaching remains challenging. In this article, the authors discuss partnership efforts to build a new teacher learning community (NTLC) to support new K-12 teachers in key constructs of transition: belonging, communication, and problem solving. Employing the methods and tools of improvement science, the partnership team established a community that allowed new K-12 teachers to engage in community building with peers, reflective thinking, and collaborative problem solving. New K-12 teachers who participated in the NTLC (n=21) found increased confidence around key constructs at the culmination of the experience. NTLC findings have implications for future collaboration between teacher preparation programs and school districts to jointly support new teachers and together mitigate challenges first-year teachers face.

### **Keywords**

New Teacher Learning Communities, Teacher Retention, Improvement Science, Curriculum Reform

### **Introduction**

New teachers are challenged by the difficult transition from a teacher preparation program into the first years of employed teaching (Johnson et al., 2014). A 2018 study reported: “Those [teachers] without mentoring leave teaching at about twice the rate of those who receive regular mentoring and collaborative planning” (Darling-Hammond, Sutchter, & Carver-Thomas). School districts invest time and money into inducting new teachers, so understanding the challenges that lead to new teachers leaving the profession is paramount. Johnson et al. (2014) have identified conditions for new teacher success and advocate for “innovative partnerships and initiatives that assist smooth transitions to the workforce” (p. 537).

Valuing partnerships between teacher preparation programs and school districts, the authors of this study sought to remain connected to pre-service teachers after the completion of training and help these new teachers hone the skills and dispositions needed to overcome first-year challenges. The district in which this study was conducted had partnered with the teacher preparation unit (elementary, secondary, and special education teacher preparation programs) since 2014 around various education reforms, research, and state-wide initiatives. One such effort was partnering to support first-year teachers. The district had an attrition rate of 6.5 percent (37 teachers) for 2016/2017 and 9.5 percent (55 teachers) for 2017/2018. Forty-three new teachers were hired for 2018/2019, the year of this study, of which 56 percent (24 teachers) were graduates of the teacher preparation programs. In partnership, representatives from both the district and the teacher preparation unit identified initiatives that showed promise for addressing district attrition.

One promising initiative for supporting new teachers is a professional learning community. Professional learning communities (PLC) support stakeholders in collective learning opportunities that are pertinent and relevant to their practice, improving the overall quality of the system and ultimately enhancing outcomes for student learning. Webb, Vulliamy, Sarja, Hamalainen, and Poikonen (2009) state, “[Teacher communities] play an important role in promoting teacher motivation and welfare believing they are instrumental in preventing teachers from leaving the profession,” with new teachers in particular appreciating these communities (p. 412).

Teacher communities show promise for continual learning in ways that traditional professional development does not. In traditional professional development, the content is not typically driven by participants. Learning communities, on the other hand, allow for participants to drive the learning by choosing the areas of practice for focused study (Attard, 2007; Boone, 2010; Westheimer, 2008). This focus on authentic issues fosters “continuous teacher learning” (Vescio, Ross, & Adams, 2008, p. 86) whereby teachers stay engaged in the authentic problems of their work over time (Bolam et al., 2005; Hollins, McIntyre, DeBose, Hollins, & Towner, 2004). Teacher participants in learning communities often describe the opportunity to reflect on their personal practice with invested and reflective others as more beneficial than traditional in-service professional development (Attard, 2007; Duncombe & Armour, 2004). In fact, data show that teachers like to engage in community of practice through PLC-like work (Leite, 2006), and they prefer a communal versus isolationist approach (Snow-Gerono, 2005) to teaching.

## Theory of Improvement Science

The authors are guided by an organizational learning approach with an emphasis on improvement science. Improvement science can be defined as “a family of approaches that guide and structure organizational learning by connecting disciplined inquiry to a focused improvement goal” (Takahashi, White, & Donahue, 2019). Improvement science is guided by the theory that understanding how systems work is key to making positive changes for optimal functionality. It is crucial for improvement teams to understand why the system is producing the outcomes that it does. At its inception, improvement science was largely applied to the automobile industry (Womack, Jones, & Roos, 1990) and later in healthcare (see Donald Berwick and the Institute for Healthcare Improvement). Most recently, scholars have applied these theories to the world of education (Bryk, Gomez, Grunow, & LeMahieu, 2015; Coburn, Penuel, & Geil, 2013; Lewis 2015).

Improvement science work is led by organizational teams interested in affecting positive change. In particular, three key

principles guide organizational learning and improvement work (Takahashi, White, & Donahue, 2019). First, improvement begins when there is dissatisfaction with the current state of affairs. Second, each system is created to produce the outcome it gets. Last, change is required in order to improve; however, not all change will lead to improvement.

Improvement science is accomplished with a variety of tools meant to aid organizational learning. These tools and accompanying materials are described in a resource guide written for improvement teams and coaches (Grunow, Park, & Bennett, 2018). When understanding the system, teams will create items such as process maps (a graphic that captures the processes or experience for a user in a system) and a fishbone diagram (a diagram where root causes around a problem are identified). Understanding the system leads to the identification of a theory of change and the creation of a driver diagram (a visual that captures the theory of change including primary and secondary drivers and change ideas) to explain the processes for change. Small, iterative changes can be made to see the impact on the system. These changes are tracked using various scaffolds to capture the effects of the change. One scaffold used to track change is the Plan, Do, Study, Act (PDSA) protocol that details the hypotheses and findings of a small cycle of data collection.

## Context for Improvement

The improvement team used improvement science to study the effect of a learning community for new teachers, in particular its potential to increase retention rates and support job satisfaction, ultimately increasing K-12 student achievement. Retention has not previously been a factor used to determine the content of teacher preparation programs, nor has it been used as a measurement of success. This study is distinguished from previous research with its focus on new teacher transition as a conduit for retention while also creating a feedback loop for teacher preparation program continuous improvement. Furthermore, by a teacher preparation program maintaining contact with its graduates during the first several years of teaching, already-established relationships and support continue, possibly mitigating transitional challenges.

The improvement team consisted of one district teacher on special assignment, two teacher preparation faculty, and one grant manager with input from district and university administration. The new teacher learning community (NTLC) itself served as the primary driver of change. Based on literature and empathy interviews (an interview guided by a semi-structured protocol that focuses on eliciting the stories of users who are most impacted by the problem), the improvement team hypothesized four secondary drivers:

1. community building for new teachers,
2. practice engaging in open and productive discourse,
3. engaging in reflective thinking to address common issues, and
4. iterative implementation to support user-focused learning.

Refer to Figure 1 for the driver diagram. Change ideas, targeting the secondary drivers, aimed to help new teachers navigate the first-year transition. For example, NTLC sessions included a Problem of Practice protocol (PoP) to support reflective thinking to address common issues. The long-term project goal was to better support teacher preparation graduates and new teachers hired in the district. For the purpose of this article, the authors highlight data related to one of the secondary drivers—engaging in reflective thinking—and how learnings from PDSAs studying the problem of PoP informed iterative change to illustrate how the improvement team supported the development of reflective thinking.

## Methods

At the outset of this improvement work, the team investigated the existing induction system using improvement science tools, and major learnings were three-fold. First, information gathered during empathy interviews compelled the authors to shift their focus from prioritized skills related to planning and instruction

to dispositions/skills needed to successfully navigate the first-year transition (e.g., problem solving; see Figure 2).

Second, the current system supported new teachers; however, coordination was unclear and the teacher preparation program played a limited role (see Figure 3). Specifically, the district required that new teachers participate in a mandatory two-year induction experience sponsored by the County Office of Education. This Teacher Induction Program (TIP) was administered by two full-time coordinators who worked to partner veteran and new teachers and offered district-wide professional development. There was no existing coordination between TIP and any local teacher preparation programs.

Third, although the investigation yielded multiple variables that contribute to retention, the team focused on constructs related to transition as an actionable intervention that might affect positive change. The authors hypothesized that teachers who were not able to “transition” or who experienced difficulty in transitioning were those who most likely would leave the profession, and thus, “retention” was an extended outcome of this study. Transition was the conduit to retention.

New teachers were invited to join the NTLC during the district-wide new teacher orientation. Then, all new teachers were emailed an interest survey and invitation to the first session.

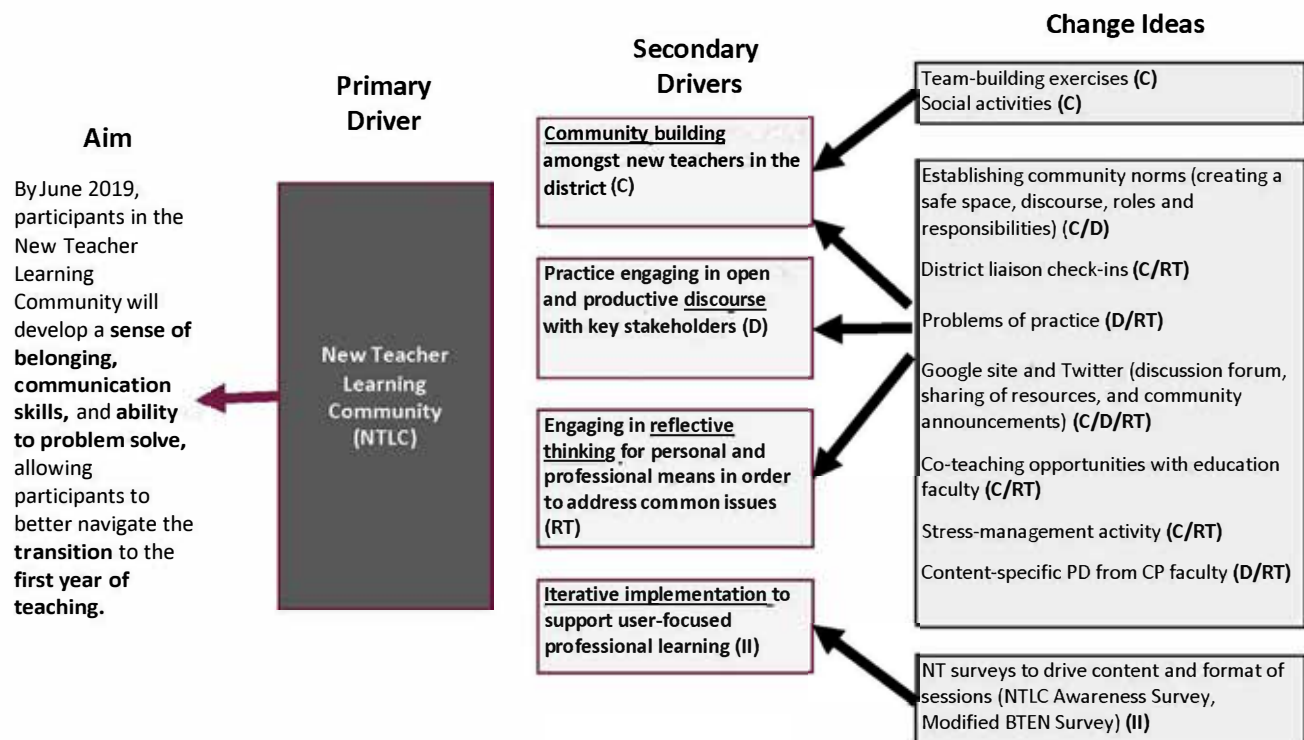


Figure 1: Driver Diagram

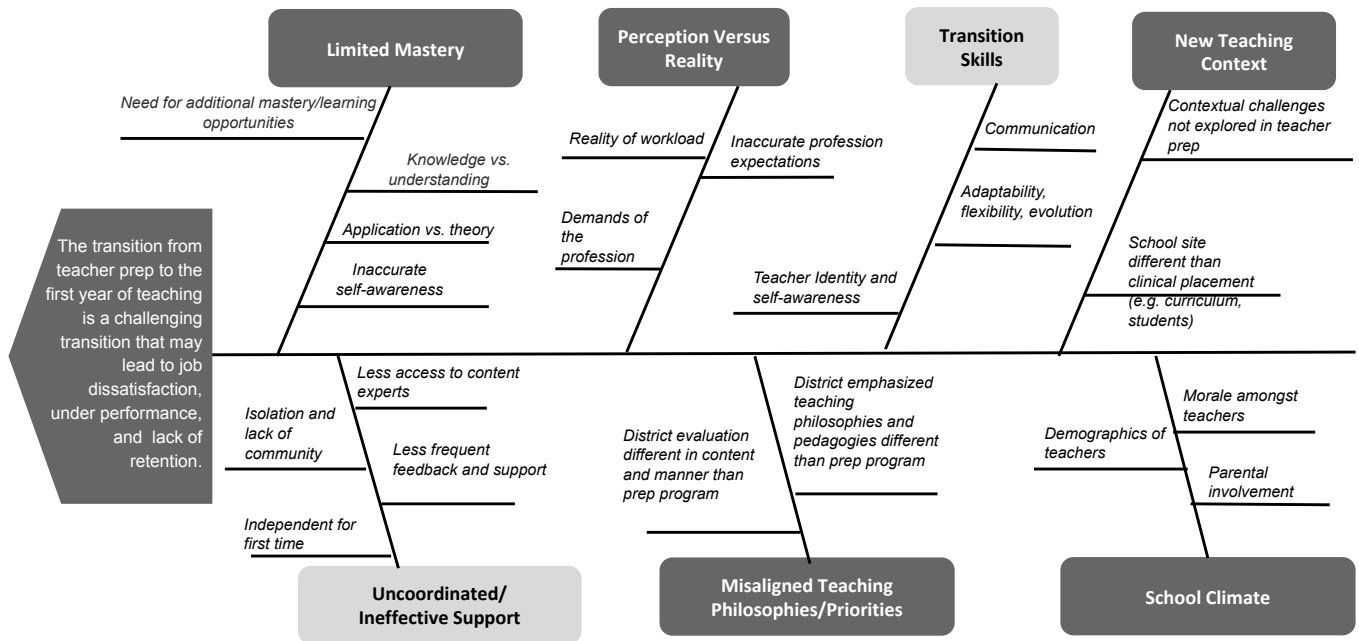


Figure 2: Fishbone Diagram

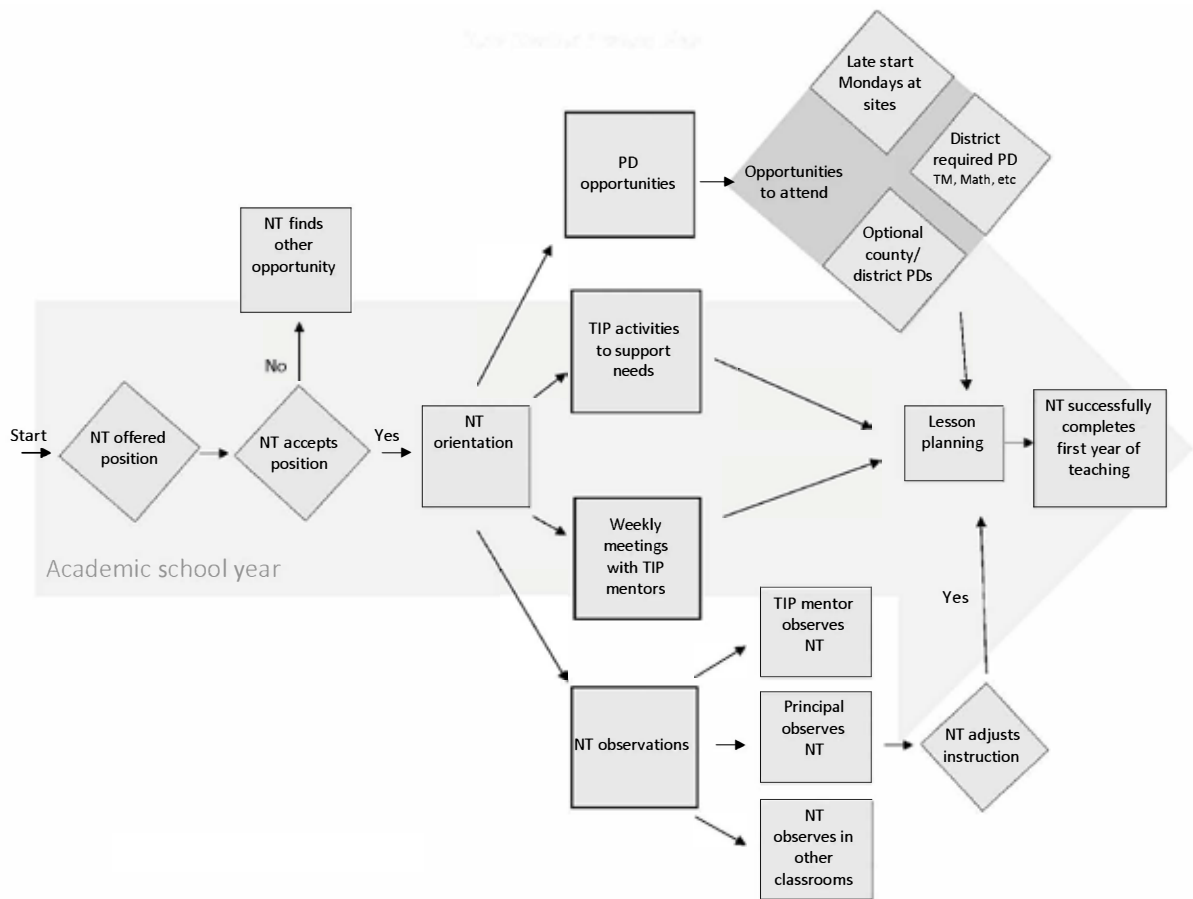


Figure 3: New Teacher Process Map

Twenty-five out of 43 new teachers initially expressed interest. The authors secured Human Subjects Institutional Review Board (HSIRB) approval for this study and obtained informed consent from all participants. No participants dropped out of the study; however, not all surveys were completed if a participant did not attend the NTLC session when the survey was administered.

The team developed a tentative plan for the 2018/2019 NTLC. The district and university incentivized participation; new teachers could timesheet their hours or receive salary credit from the district, and the university provided \$250 for attendance at four of the six sessions. The NTLC included the following:

- One-hour sessions every other month that included community building, teacher-driven content supported by faculty expertise, and exploration of problems of practice
- Informal check-ins with new teachers in between sessions
- Online Google site support
- Co-teaching opportunities with teacher preparation faculty
- Social activities

All NTLC sessions were jointly planned and implemented by district and university personnel, and learnings from PDSAs—grounded in both process and outcome measures—informed iterative changes to NTLC components.

This article reports on the system learning that occurred around the secondary driver, engaging in reflective thinking in order to address common issues. In the two NTLC sessions focusing on reflective thinking, the authors operationalized this as problem solving by engaging participants in a PoP—an inquiry-based protocol where teachers identified a problem and group members shared interpretations and solutions. The team conducted PDSAs during NTLC sessions two and four examining participation in the PoP and the extent to which teachers elaborated upon the problem and provided solutions.

In advance of session two, participants were surveyed regarding the session focus, and the topic of parent communication was selected. At the session, each teacher completed a quick write identifying a parent communication challenge. Some examples included parent/teacher language barriers and coordinating with parents to collaboratively support student learning. One participant from each table volunteered to share a problem with their group, engaging in a structured protocol (see Figure 4), which covered presentation of problem, response to problem, group collaborative inquiry, possible next steps, and presenter response. Time increments were allocated and the participant presented the problem and gave a response. Problems identified aligned with three primary themes: eliciting parent support, forming relationships with parents, and communication barriers.

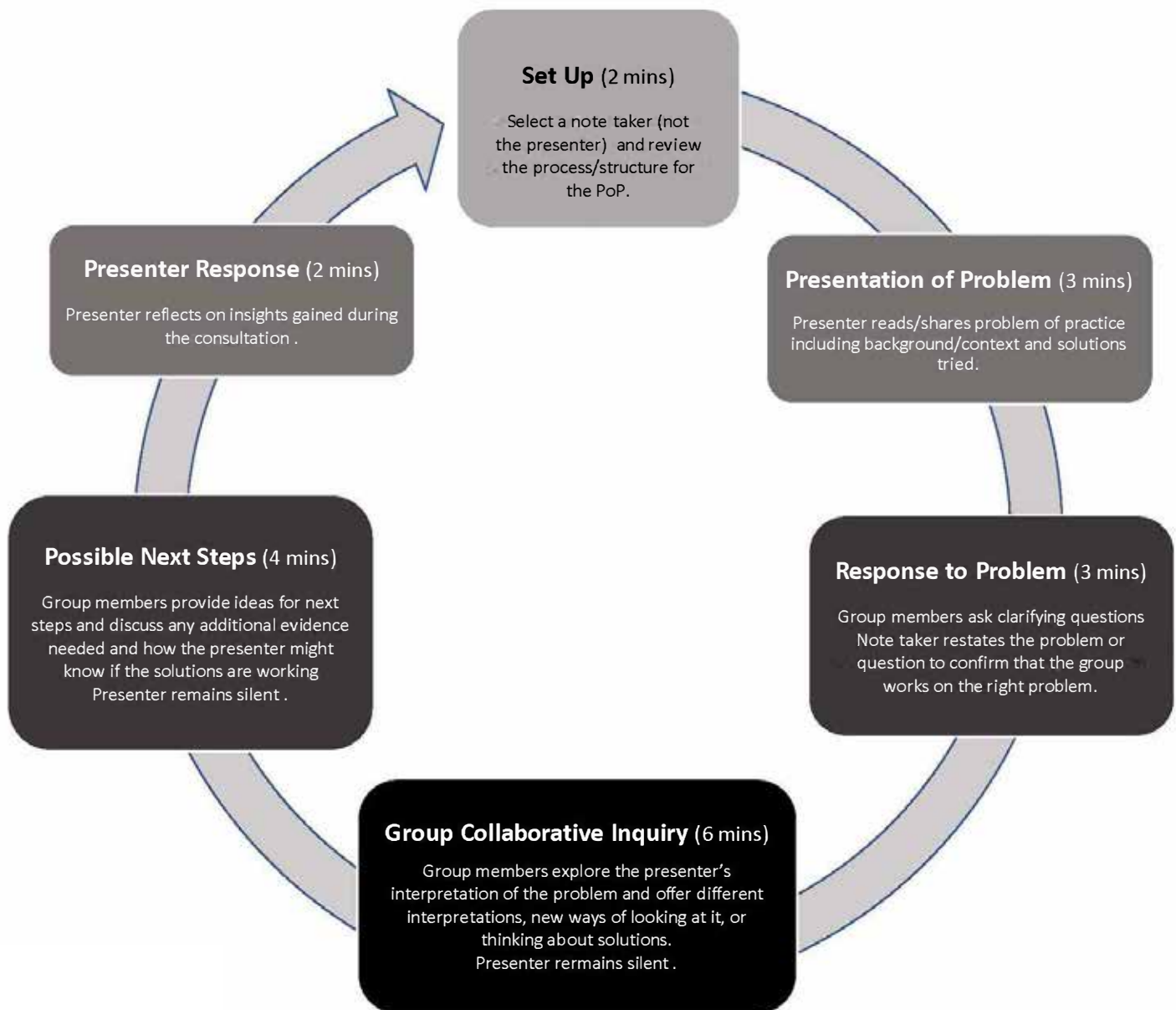
## Study of the Intervention

One key tenet of continuous improvement is to better understand the system as a whole in order to fully comprehend the production of particular outcomes (Bryk, Gomez, Grunow, & LeMahieu, 2015). The improvement team used PDSA cycles to study the manner in which any changes positively or negatively contributed to desired process outcomes. The team also administered an outcome measure at three points to measure growth across the main constructs (belonging, communication and problem solving). PDSAs were used to evaluate change ideas (e.g., establishing NTLC community norms, liaison check-ins with new teachers, co-teaching with university faculty) including informing next steps and changes for subsequent NTLC sessions. Nine PDSA cycles were conducted around five key components of the NTLC community: NTLC sessions, new teacher check-ins, co-teaching opportunities, NTLC Google site, and a district awareness survey. A common form (Grunhow, Park, & Bennett, 2018) drove PDSA cycles conducted by all improvement team members. The team rotated leadership of the PDSA cycles and jointly set goals and predictions for each cycle. PDSA data was analyzed on a monthly basis to plan next steps for the community.

## Process Measures

To measure new teacher attendance and participation, the team maintained a spreadsheet documenting NTLC participation. Participation was recorded for face-to-face sessions, online discussion forums, co-teaching opportunities, check-ins, etc. for each participant, enabling the team to track participation within and across NTLC components. The spreadsheet was examined during team huddles to identify dips and spikes in participation, make predictions about why these occurred, and collect additional data to test predictions.

At five of the six NTLC sessions, the team administered a satisfaction survey to capture participant perspective on the session. The survey varied slightly based on content provided in each session, but four questions remained consistent in order for changes to be tracked over time (e.g., The NTLC is a supportive space for new teachers). Responses to these four questions were averaged, and averages were compared across the timeline distribution with special attention paid to averages that significantly increased or decreased. This data drove the content and activity for the subsequent session. For example, a survey was given to participants with a choice of four topics of interest to new teachers. Results from this survey determined the content for the subsequent NTLC session. Satisfaction surveys given after sessions two and four included questions specific to the problem of practice activity.



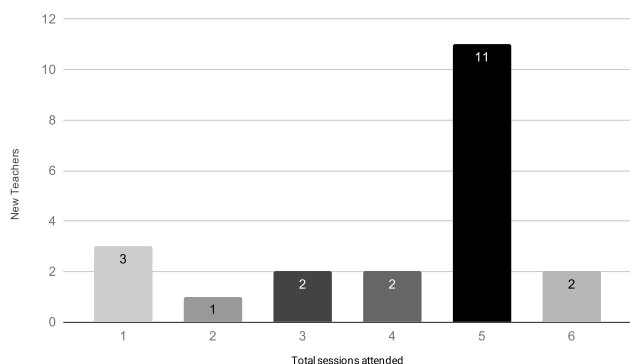
**Figure 4: Problem of Practice (PoP) An Adapted Inquiry Protocol**

### Outcome Measures

A new teacher survey measuring key constructs—belonging, communication skills, and problem-solving ability—was inspired by work in the Building a Teaching Effectiveness Network (BTEN) (Takahashi, Bryk, Hausman, & Yamada, 2015). The survey included 15 questions on a five-point Likert scale with five questions for each construct (e.g., Experienced teachers make new teachers feel welcome here). New teachers completed the same survey at the end of sessions one, three, and six. Analysis of the new teacher survey included responses

grouped by the associated key construct and compared within that grouping of questions for beginning and endpoint distributions. Those teachers who attended both sessions one and six and who completed all 15 survey questions were included. This comparison analysis was possible for a subset of nine of the 21 participants or 43 percent of participants.

The team conducted semi-structured interviews post-intervention to better understand participant experience (n=13). Team members jointly created the interview protocol, and the questions addressed the efficacy of the various components of the NTLC.



**Figure 5: New Teacher Attendance**

Interviews were transcribed and coded thematically using themes in a priori survey questions (e.g., problem-solving abilities).

## Results

Attendance at the six sessions varied with a range of 11-18 participants per session (See Figure 5). The average attendance for the six sessions was 14. In all, 21 distinct teachers participated.

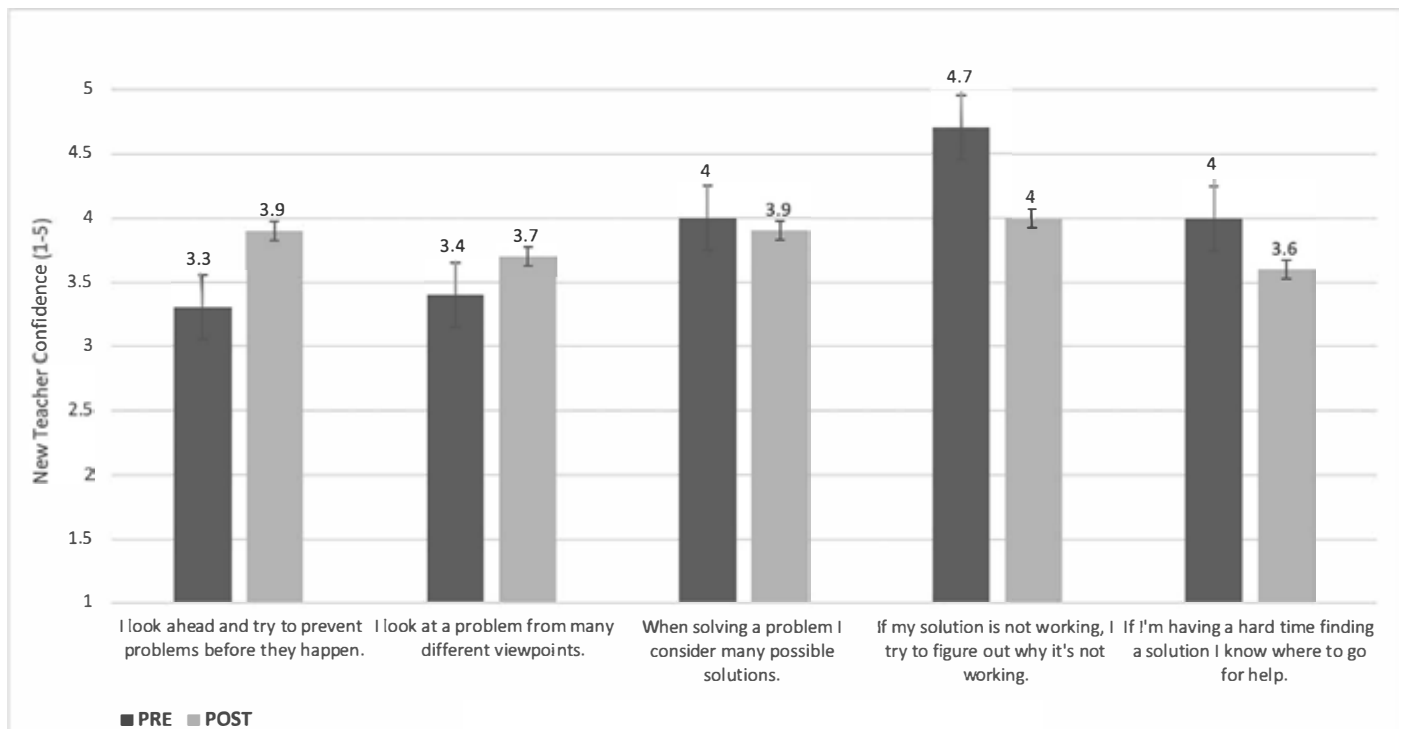
A PDSA on the implementation of the PoP protocol to impact new teachers' problem-solving abilities was conducted, and fieldnotes revealed that during the PoP, all new teachers asked clarifying questions of the presenter and provided suggestions. For example, one participant shared a problem concerning a student exhibiting severe behaviors in the classroom. The participant noted that student behavior was reinforced by the parents. Following the inquiry protocol the group listened, asked clarifying questions, and finally offered suggestions to address the problem including creating a cohesive front between all teachers instructing this student and inviting student services personnel observe the classroom dynamic. At the conclusion of the PoP activity, participants were asked to complete a satisfaction survey. The satisfaction survey revealed that all 11 teachers felt comfortable participating during the PoP, with three giving the PoP a five out of six, and seven giving the PoP a six out of six in terms of their level of satisfaction. In the open-ended response question, all 13 teachers identified the PoP as the highlight of session two, with one teacher even noting: "I might find a way to use this in class."

On the satisfaction survey for NTLC two, one teacher recommended allocating more time in a future session to enable greater exploration of problems. Therefore, the team revised the session four PoP, allowing for more time and for all teachers to share their individual problem by adjusting the structure of the PoP to be more open-ended as follow: presentation of problem, interpretations, and next steps. For example, for the first phase

of the protocol, a new teacher presented the problem of a high school student showing disengagement in class and not submitting assignments. After posing this problem, the new teachers in the group explored possible interpretations of this problem, identifying what might be causing the student apathy. Based on these interpretations, the group proposed tangible next steps on how to increase this student's engagement and submission of assignments. Although there was a provided time increment for the discussion of each problem, groups decided how much time they spent on each component of the protocol. In addition, presenters could speak throughout the entire protocol, not just at the beginning and end. Satisfaction surveys from session four revealed that all 15 of the teachers in attendance gave a six out of six on their level of comfort participating, an increase from session two. Open-ended responses to the satisfaction survey again mentioned the PoP as the highlight of the session, with one teacher stating, "having the freedom to work on what we need as individuals" was a beneficial change. Less structure to the PoP also created better dialogue and more authentic conversation.

Outcome data (e.g., new teacher survey) for nine teachers who attended both sessions one and six showed growth in confidence around key constructs over the course of the year. Teacher responses to five survey questions around the key construct of problem solving indicated that confidence levels increased for two of the five questions and dropped slightly for three of the questions (see Figure 6). For Q1: I look ahead and try to prevent problems before they happen, teachers reported an average confidence of 3.3, (scale of 1-5) an average that increased to 3.9 at post distribution. Similarly, when asked to respond to the statement Q2: I look at a problem from many different viewpoints (e.g., my own students, principals and parents), average teacher confidence levels increased slightly from 3.4 at pre-distribution to 3.7 at post. The authors hypothesize that the decrease in growth for three of the five survey questions is tied to a lack of follow up on new teacher implementation of cogenerated solutions during PoP. The PoP inquiry helped teachers to identify problems and possible solutions, but the application of any new solutions in their school context occurred only after the sessions. Although a limitation of the study, the team focused more on collaborative, face-to-face problem solving rather than long-term implementation solutions.

Interview data overwhelmingly revealed that teachers valued the collaborative approach to problem solving real-life classroom issues, and many stated that this practice was one of the most valued aspects of the NTLC sessions. When asked how the NTLC sessions impacted their ability to problem solve, one teacher commented "...sometimes it's just nice to get a fresh set of eyes...to help problem solve. I definitely felt that part was really



**Figure 6: New Teacher Confidence/Efficacy-Problem Solving**

beneficial, and then taking what they said, and applying it to my class...it gave me a different perspective of how to approach some problems” (Interview Participant 10). A second teacher concurred and appreciated the co-generation of solutions “A lot of times when I’m by myself trying to figure something out, I get stuck in my own ways, but hearing other teachers share their ideas was pretty helpful” (Interview Participant 12).

The PoP protocol helped create an environment whereby experiencing challenges was perceived as a norm enabling teachers to speak freely. Many spoke of how this practice gave them immediate ideas to implement or practical knowledge for the future. One teacher stated, “We had to pick one challenging student or a challenging moment...I implemented it in my classroom, and it was really great. That student has really improved, and I attribute a lot of that to working with my peers...in figuring out a solution together...the collaboration was extremely helpful” (Interview Participant 2).

## Discussion

First, overall data show the NTLC encouraged new teachers to engage in reflective thinking to address common issues. The authors hypothesize that the iterative nature of the work largely contributed to the five major learnings in this study. The four PDSA cycles conducted on each of the sessions allowed the data

to drive the content and delivery for the community. As previously mentioned, participants frequently suggested topics of focus or amendments to activities for subsequent sessions. The iterative nature of the PDSAs allowed for quick, small changes to be made in response to patterns in data. Some changes were logistical, including changing the start time of the sessions and switching the day of the week. Other amendments were more process oriented, including the decision to keep or replace interactive activities in sessions based on observable engagement by teachers. Similar to research on teacher learning communities (Attard, 2007; Boone, 2010; Westheimer, 2008), this feedback loop allowed the participants to drive the learning, which likely encouraged sustained attendance and learning over time (Vescio et al., 2008, p. 86).

Second, new teachers frequently referred to all of the unforeseen issues that came up throughout their first year of teaching (e.g., geographic location of classroom impacting collaboration opportunities with veteran teachers, systems for managing paperwork, and the importance of self-care). A focus on problem solving and reflective thinking enabled teachers to apply deliberate processes allowing them to tackle these unforeseeable problems. Additionally, responsively choosing problems generated from the group made the experience authentic for teachers. If participants feel safe, this creates the most space for teachers to



advance their practice by allowing them to “distance themselves from their current ideas and take new perspectives” (Brodie, 2014, p. 236).

Third, through sharing common problems, new teachers stated that they felt connected to others, thereby fostering a sense of community whereby they felt comfortable engaging with one another around difficult questions. Satisfaction surveys given at the end of each session and final interview data speak to participants’ high comfort level with sharing. One teacher commented:

“I’m a special education teacher, and at times, that is very isolating. You don’t have the team partners that you have in teaching general education, but going to the sessions I could see the people that I graduated from [the university] with and that are in the same districts and teaching and [who] understand the same things that I am going through, so in a way that was like my grade-level team.” (Interview Participant 4)

As members of the learning community, new teachers were asked to share their practice in public ways. There is a collective accountability to the group whereby everyone is, in part, responsible for the learning that takes place for all (Hord, 1997; Webb et al., 2009) and that this very vulnerability encourages building relationships and community.

Fourth, sharing with each other encouraged teachers to explore a common issue more deeply and to see it from different perspectives. By doing this work in community, they were able to learn from each other’s perspectives and, in some cases, have their own views challenged in safe and productive ways. Attard (2012) found reflective writing on personal issues of importance, combined with collaborative reflection on those issues, allowed participants in a researcher-created teacher community to benefit professionally. Collaborative reflection on problems of practice allowed for collective knowledge construction via question posing and exposure to the ideas of others (Attard, 2007; Nissila, 2005; Orland-Barak, 2006; Zellermayer & Tabak, 2006). Access to alternative perspectives from the larger community is also seen as key to maintaining an invigorating and diverse teacher community (Katz, Kaplan, & Gueta, 2009).

Lastly, data reveal that participants were engaged in the learning environment. Attendance at NTLC sessions was consistent throughout the year. In fact, 11 of the 21 total attendees participated in five of the six sessions although they only needed to attend four sessions to receive the participatory stipend. The voluntary participation of a significant group of attendees demonstrates that attending the sessions was a positive experience. One teacher stated, “I enjoy attending the sessions. I never felt like they weren’t helpful at all” (Interview Participant 12). While

new teachers lead extremely busy and full lives, they carved out an hour of their time to attend these meetings. By continually focusing on the needs of the teachers and being responsive to their feedback, the NTLC promoted an engaged community willing to immerse itself in solution-oriented practice.

The team had limited access to new teachers who did not participate in the NTLC, so there is insufficient data to apprise the team about why these individuals chose not to participate. In addition, the team was not aware of the manner in which their non-participation did/did not affect their sense of belonging and ability to problem solve and communicate.

## Limitations of the Study

One limitation of this work is the lack of ability to generalize due to the limited number of participants and voluntary nature of participation. As new teachers were not mandated to attend, this limited the number of participants who attended individual sessions and were present for data collection. A second limitation was the lack of follow-up after new teachers engaged in the PoP to see what recommended next steps were implemented by the new teachers and the impact on addressing the identified problems. Finally, the team was unable to determine why new teachers chose not to participate in the NTLC opportunity as we were unable to query those who declined to participate.

## Recommendations for Future Research

The team is interested in continuing this research in future iterations of the NTLC. One focus for future research includes involving non-participants in data collection as a comparative study to further illustrate the value of the NTLC. Additionally, further work to better understand why new teachers opted to not participate could potentially make the community more desirable. Also, as mentioned there were instances in this work where following outcomes (e.g., the success rate of implementing suggestions for the PoP or long-term retention rates of teachers) would be very valuable for future learning. Lastly, the authors identified multiple variables that contribute to teacher retention in the fishbone diagram. Future work could explore these other factors that lead to attrition, such as school climate or administrative support.

## Conclusions

The iterative, data-driven continuous improvement focus of the work enabled the team to develop a community that prioritized new teacher belonging and development of problem-solving skills to support the transition from teacher preparation to the first year of teaching. Current induction systems mostly provide

new teachers with an individual mentor who works one-on-one with the early career teacher. This, in some ways, continues to perpetuate a more isolated model of induction and does not introduce and immerse the novice with fellow new teachers. The NTLC described in this study provided early career teachers with the opportunity to join a cohort (a community), thereby remedying this issue of isolation and contributing to a sense of belonging.

In addition, teacher preparation programs are uniquely positioned to facilitate an NTLC. New teachers desire to explore and problem solve a variety of issues, especially those likely difficult to admit to their school site principal or an assigned induction mentor. The NTLC, composed of a small group of peers experiencing similar issues and trusted teacher-preparation mentors, provides a unique space for new teachers to express vulnerability and leave equipped to address challenges.

On a pragmatic level, the NTLC was effective in supporting graduates of the teacher preparation program as well as leading to subsequent program reform. Teacher preparation programs are short and often impacted with standards that have to be taught, making it nearly impossible to prepare a new teacher for everything they will encounter in their first year of teaching. The NTLC provided the teacher preparation program with an additional year to remain connected with its graduates and continue to provide mentoring. Furthermore, implementing and researching the NTLC informed teacher-preparation faculty about the importance of developing problem-solving skills while pre-service teachers are enrolled in their training program, thus impacts future revisions to the teacher preparation program.

Finally, the application of improvement science allowed for a responsive, learner-focused process, an essential component of the community's success. New teachers in the community felt valued and heard, allowing their feedback and needs to guide the content and structure of NTLC sessions. Without the application of improvement science, the focus on the user could have been lost or minimized, resulting in less personalized learning.

### References:

Attard, K. (2012). Public reflection within learning communities: An incessant type of professional development. *European Journal of Teacher Education, 35*(2), 199-211. Doi:10.1002/tea/20303.

Bolam, R., McMahon, A., Stoll, L., Thomas, S. & Wallace, M. with Greenwood, A., Hawkey, K., Ingram, M., Atkinson, A., & Smith, M. (2005). *Research report No. 637: Creating and sustaining effective professional learning communities*, University of Bristol.

Boone, S. C., (2010). Professional learning communities' impact: A case study investigating teachers' perceptions and professional learning satisfaction at one urban middle school (Doctoral dissertation).

Brodie, K. (2014). Learning about learner errors in professional learning communities. *Educational Studies in Mathematics, 85*(2), 221-239. Doi: 10.1007/s10649-013-9507-1.

Bryk, A. S., Gomez, L. M., Grunow, A., LeMahieu, P. G. (2015). *Learning to improve: How America's schools can get better at getting better*. Cambridge, MA: Harvard Education Press.

Coburn, C. E., Penuel, W. R., & Geil, K. E. (2013). Research-practice partnerships: A strategy for leveraging research for educational improvement in school districts. William T. Grant Foundation: New York, NY.

Darling-Hammond, L., Sutchter, L., & Carver-Thomas, D. (2018). *Teacher shortages in California: Status, sources, and potential solutions* (research brief). Palo Alto, CA: Learning Policy Institute.

Duncombe, R. & Armour, K. M. (2004). Collaborative professional learning from theory to practice. *Journal of In-service Education, 30*(1), 141-166.

Grunow, A., Park, S., Bennett, B. (2018). Improvement science at your fingertips: A compilation of resources for coaches of improvement. Improvement Collective and Improvement Science Consulting Version 1.2b.

Hollins, E., McIntyre, L., DeBose, C., Hollins, K., & Towner, A. (2004). Promoting a self-sustaining learning community: Investigating an internal model for teacher development. *International Journal of Qualitative Studies in Education, 17*(2), 247-264.

Hord, S. M. (1997). *Professional learning communities: Communities of continuous inquiry and improvement*. Austin, TX: Southwest Educational Development Laboratory.

Johnson, B., Down, B., Le Cornu, R., Peters, J., Sullivan, A., Pearce, J., & Hunter, J. (2014). Promoting early career teacher resilience: A framework for understanding and acting. *Teachers and Teaching, 20*(5), 530-546.

Katz, I., Kaplan, A., & Gueta, G. (2009): Students' needs, teachers' support, and motivation for doing homework: A cross-sectional study, *The Journal of Experimental Education, 78*(2), 246-267.

Nissila, S. (2005). Individual and collective reflection: How to meet the needs of development in teaching. *European Journal of Teacher Education, 28*(2), 209-219.

Orland-Barak, L. & Yinon, H. (2006). When theory meets practice: What student teachers learn from guided reflection on their own classroom discourse. *Teaching and Teacher Education, 23*, 957-969.

Snow-Gerono, J.L. (2005). Professional development in a culture of inquiry: PDS teachers identify the benefits of professional learning communities. *Teaching and Teacher Education, 21*(3), 241-256.

Takahashi, S., White, M., & Donahue, C. (2019). A system of measures to support improvement in teacher preparation. WestEd: San Francisco, CA.

Vescio, V., Ross, D., & Adams, A. (2008). A review of research on the impact of professional learning communities on teaching practice and student learning. *Teaching and Teacher Education*, 24(1), 80-91. Doi: 10.1016/j.tate.2007.01.004.

Webb, R., Vulliamy, G., Sarja, A., Hamalainen, S., & Poikonen, P. (2009). Professional learning communities and teacher well-being? A comparative analysis of primary schools in England and Finland. *Oxford Review of Education*, 35(3), 405-422. Doi: 10.1080/03054980902935008.

Westheimer, J. U. (2008). Learning among colleagues: Teacher community and the shared enterprise of education. In M. Cochran-Smith, S. Feiman-Nemser, & D. J. McIntyre (Eds), *Handbook of research on teacher education: Enduring questions in changing contexts*. Reston, VA: Association of Teacher Educators.

Womack, J. P., Jones, D. T., & Roos, D. (1990). *The Machine that Changed the World*. New York, NY: Free Press.

Zellermayer, M. & Tabak, E. (2006). Knowledge construction in a teachers' community of enquiry: A possible road map. *Teachers and Teaching: Theory and Practice*, 12(1), 33-49.



**Tanya Flushman**

**Tanya Flushman, Ph.D.**, is an associate professor in the School of Education at California Poly San Luis Obispo and she co-directs the CSU Center for the Advancement of Reading and Writing. Her areas of expertise are early literacy development, clinical teacher preparation, and disciplinary literacy teaching. Her recent grants emphasize partnering with districts to transform teacher preparation and teaching disciplinary literacy in science in elementary schools. Flushman coordinates and teaches in the MA Curriculum and Instruction program. She can be reached through email at [tflushma@calpoly.edu](mailto:tflushma@calpoly.edu).



**Sarah E. Hegg**

**Sarah E. Hegg**, is program manager working with the School of Education and Center for Engineering, Science, and Mathematics Education (CESAME) at California Polytechnic State University, San Luis Obispo. Her research interests include co-teaching in the clinical experience, new teacher induction, pre-service teacher supervision, and utilizing improvement science for education reform. Hegg's recent work has been published in *Issues in Teacher Education* and *Teacher Education Quarterly*. Contact her at [shegg@calpoly.edu](mailto:shegg@calpoly.edu).



**Megan Guise**

**Megan Guise, Ph.D.**, is a full professor of English Education in the School of Education at California Polytechnic State University, San Luis Obispo. Her research interests include enhancing the implementation of co-teaching during the clinical experience, effective models of professional development, and feedback on teaching. Guise's recent work has been published in *Issues in Teacher Education*, *Teaching and Teacher Education*, and *Teacher Education Quarterly*. Her email address is [meguise@calpoly.edu](mailto:meguise@calpoly.edu).



**Laura Flessner**

**Laura Flessner, M.A.**, is a sixth grade teacher in Lucia Mar Unified School District. For the past two years, she worked as the science teacher on special assignment and district liaison on a partnership grant focusing on teacher preparation. Flessner has conducted research with California Polytechnic State University, San Luis Obispo since 2017, where she also earned her master's in curriculum and instruction. Her research interests include integrated STEM education, disciplinary literacy, and curriculum development. Reach her via email at [laura.flessner@lmsud.org](mailto:laura.flessner@lmsud.org).