Improving Leading Indicators for Self-Efficacy and Collective Teacher Efficacy

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Abstract

This article presents conclusions from survey data, observations from classroom visits, and teacher interviews. The evidence presents findings from 126 teachers who participated in a series of professional learning institutes focused on how students learn, using learning principles developed by Christine Drew and Richard Erdmann, and related influences from John Hattie's research. The study participants taught in a mid-sized urban school district. 94 of the 126 participants completed the final survey. The institutes took place between mid-January and May of 2022, the first school year post-COVID.

The purpose of the study was to determine whether teacher beliefs about their impact on learning or self-efficacy would change based on a measured increase in student learning after implementing a new or redesigned practice based on the learning principles from the institutes.

Ninety-nine percent of the teachers applied what they learned and over 80% believed that their applications improved student learning. Another 11% believed that student learning "probably" improved.

Keywords: school improvement, self-efficacy, collective teacher efficacy (CTE), science of learning, professional development, autonomy, choice

Introduction

The initial intent of the Teams Improving Practice (TIP) professional learning institutes, analyzed in this article, was to create collective teacher efficacy in participating schools by creating peer examples of improved student learning. The program design requires 9 months of contact time, starting early in the school year so that teachers in the cohort could influence other teachers in the school to modify their teaching practices beginning mid-year. It was the first year after COVID and high teacher absenteeism was projected so the beginning of the project was delayed until January. The program goal was adjusted, to focus on self-efficacy with an intention to include collective efficacy in year two of the project. Within one month of the first training session, 72 percent of teachers reported an implementation of a new strategy and a related increase in student learning. By the end of the school year, only 2.1 percent did not know if their impact had increased. This paper concludes that teachers who apply and measure the results of their professional learning will experience an increase in self efficacy. Though we had modified the goal to achieve collective teacher efficacy in Year Two of the training, after only one month 80 percent of the teachers did report sharing their results with other teachers in their schools, a first step towards CTE.

Materials and Methods

Principals selected teachers (and two librarians) from grades K-12 to participate in Teams Improving Practice (TIP) Professional learning institutes during the 2021-2022 school year. This 63-hour training spanned five months, and four Institute days, and introduced teachers to design strategies based on the sciences of learning. During these institutes, 126 teachers from 48 schools participated, with about 100 attending any given set of institutes. Shortages of substitutes and COVID continuance made full attendance difficult for 100% participation. Of the participants, 94 teachers from 40 schools attended the last Institute and responded to the summative survey accounting for 76 percent of teacher participants. There were more than twice as many elementary teachers in the cohort than secondary teachers. The findings in this report are derived from the responses to participant surveys pre- and post-institute, teacher interviews, and classroom visits. The actual summary questions and answer formats follow:

1. I have applied one or more Design Strategies from the Institutes. Yes or No.
2. The impact of one or more of the strategies was positive. I don't know. I think so, but not sure. Somewhat. Dramatically (over a letter grade).
3. How do you think your training experience impacted your students? Check all that apply - Foundation skills are improved, Vocabulary retention and use, Conceptual understanding, Better memory retrieval, More success at DOK levels 3 & 4. No impact on students.
4. I have used the following strategies. Check all that apply - Make learning visible with a sense of progress, make endings memorable, and use models, patterns and their exceptions. create intentional beginnings to establish a knowledge platform, space memory retrieval with variation and association, ask students to paraphrase & summarize, and use games.
5. I have data to share. Yes or No.
6. How many colleagues have you shared something with? None, 1-4, 5-8,
7. If you shared, describe what you shared and how. Free Response
8. My colleagues have used what I shared. Free response.

The theory of change for school improvement was based on two similar schools of thought. The first is from self-determination theory (Ryan and Deci, 2017) and suggests that autonomy (choice), a growing sense of competence, and social relatedness are critical to a sense of well-being. Addressing all three are foundational to our change model. Schools were asked to select teachers for the training who were considered early adopters in the school and were respected by other teachers in the school. These teachers were part of a Teacher Learning Cohort (TLC), were expected to influence other teachers by sharing their experiences, and this process addresses using social relatedness as a change process. The teachers selected were not told how to teach but instead presented with Learning Principles about how students learn and related research from John Hattie. From this information, they could design their applications. This addressed the need for autonomy. The teachers would choose what to do and design how to do it. Finally, they were asked to choose a way to measure learning improvement that they would believe. This would lead to a sense of growing competence or progress.

The second school of thought is based on Bandura's (1986, 1997) four sources of self-efficacy and the belief that these are also fundamental in the development of collective teacher efficacy (Goddard, Hoy and Hoy, 2000). The change model applied these four forces to the development of self-efficacy on the part of the TLC. Success was heavily reliant on these participants experiencing learning improvement in their classrooms as a result of applying what they learned.

The first source was an affective state and it needed to be established at the very beginning. The training needed to create an atmosphere relieved from the stress of school and the reminder of failures. The location was an art museum, the wall was a large stained glass mural, the tables were all covered with tablecloths, every table had a vase with cut flowers, music was playing, and the workspace was surrounded by dividers covered with Impressionist art that was used in the training. Teachers walked in and immediately many of the teachers were snapping photos with their phones. In addition, there needed to be a reinforcement of the affective state at the end. At each table each TLC participant needed to state, "I promise" (Milkman, 2021), and then finish with what they were going to accomplish before the next Institute.

The second source was to create a mastery experience or a sense of progress. The first Institute focused on one Learning Principle with a strong track record of learning improvement - spaced memory retrieval with variation and association. To create the initial mastery experience the TLC was divided into two groups, A and B. Both groups were asked to memorize a list of words, but Group A worked with the Learning Principle while Group B read about memory formation. Ninety minutes later both groups were asked to memorize a second list of words and again Group A used the Learning Principle and Group B read another article about memory formation. Ninety minutes later both groups were asked to write down the words from both lists. Group A scored about 95% while Group B scored about 65%. This Learning Principle was combined with a second force suggested in the Goddard paper (Goddard, Hoy, and Hoy, 2000) - task analysis, which is also a high ranking influence on learning in John Hattie's work (Hattie, 2017). But in this case, the task analysis was between the Institute leaders and teachers in the cohort. The teachers would then use this model in their own classrooms with students. The teachers were asked to explain their change in teaching and learning design to the students and why they were doing it.

The third force was to create a vicarious experience for the TLC members. A story provided the example. Daisy was an eighth-grade social studies teacher and taught about 120 ESL and 504 students. Her Friday vocabulary tests averaged 69%. She implemented the Learning Principle and her scores improved to 94% and stayed in the 90s for the remainder of the year. On the end-of-year test 83% of her students scored proficient or above. In the end-of-year analysis. By the end of the year 60% of the TLC teachers were using this Learning Principle.

The fourth force was social persuasion. In any group, some are early adopters and that proved to be true in the TLC. Beginning with the second institute, every training day began with a reporting out so that the TLC members could hear that others were applying what they learned and achieving success.

The following describes the content used in the Institutes, which were activity-driven. After the first part of Institute One, the Institutes were all designed around a Big Beautiful Question (BBA), Learning Principle, and Design Strategies.

Institute 1 (Day One)

What is Learning?
- ▪ What do we need to learn?
  - o Knowledge, skills, habits
- ▪ What does it mean to have learned?
  - o Learning is inferred from measurement and is intended to be durable, flexible, and sustainable (the student has enough interest to continue learning independently and the skill to do it successfully)
- ▪ What do we need to understand about the sciences of learning?
  - o Cognition, Motivation, Relationships

BBQ: How do we compensate for a brain wired to forget?

Learning Principle: Repeat to remember and remember to repeat.
Design Strategies:
      Space memory retrieval,
      Use associations with variation, and
      Create a sense of progress.
Institute 1 (Day Two)
BBQ: How do we develop students who want to learn?
Learning Principle: Use beginnings to create engagement, the challenge, and relevant learning platforms.
Design Strategies:
      Create expectations and goals,
      Use choice,
      Establish early visible successes, and
      Create incomplete knowledge platforms.
BBQ: How do we create a love for learning?
Learning Principle: Create positive endings.
Design Strategies:
      Ask students to summarize, and
      Use games.
Institute 2 (One Day)
BBQ: Is Rigor Required?
Learning Principle: The burn is where you learn.
Design Strategies:
      Use small steps,
      Break it down,
      Improvise from models,
      Use patterns and their exceptions, and
      Provide feedback.
Institute 3 (One Day*)*
BBQ: Can Creativity Be Learned?
Learning Principle: Creativity Comes to the Prepared Mind.
Design Strategies:
      Observe,
      Abstract and generalize,
      Transfer, and
      Synthesize.

Results and Discussion

Principals received a monthly report based on teacher surveys and observations during the training. In addition, teacher videos were collected during the Institutes describing their classroom efforts to apply what they had learned. In prior TIP cohorts, approximately ⅓ of the TLC teachers implemented strategies after the first two training days, which were consecutive. There were three differences from the past with this training:

1. The two days of this training were a month apart.
2. The first day ended with a soft commitment, which had happened only once before and then by accident.
3. The facility was superior to any we rented before - the beginning was better.

We observed three differences from the past as illustrated in the graphs below. As a result of the institute, the TLC overwhelmingly believed the training would improve student learning. Over 72% of the TLC implemented something they learned instead of 33%. Finally, 78% of the TLC were already sharing in their schools.
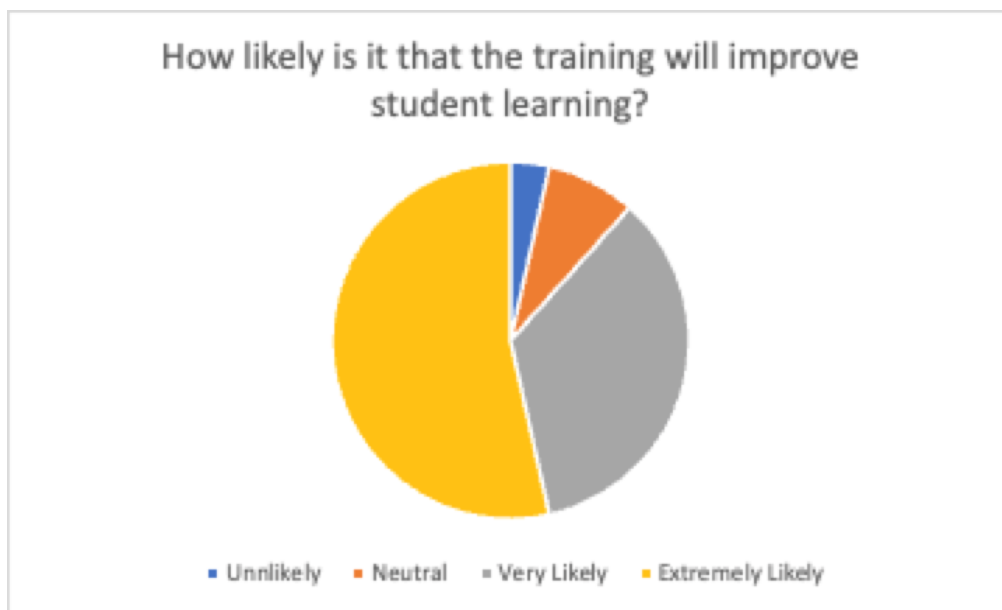
Figure 1

Figure 1 shows that by the end of the first day approximately 90% of the TLC already believed that it was very likely to extremely likely that learning would improve as a result of the training.
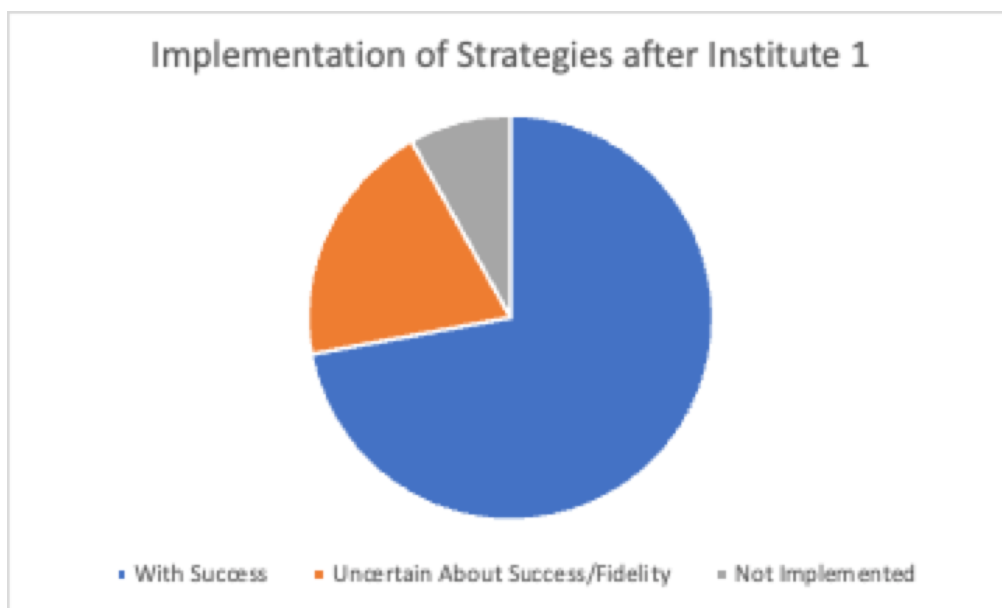

Figure 2

Between days one and two, which were only one month apart, Figure 2 shows that 72% of the teachers in the TLC had implemented a strategy with success.

Figure 3

And, although we had not expected it, Figure 3 shows that almost 78% of the TLC teachers had begun sharing what they learned with other teachers in their schools.

During the second day, a math teacher reported that on his end-of-week test on fractions, no student scored below an 80 on the test. This was his most difficult unit for students and post COVID he expected learning loss. In eight years of teaching, he had never experienced such high scores. He implemented spaced memory retrieval. He reduced the number of problems in his homework assignments and spaced them over the day and week. His reporting to the group resulted in comments like the following in the end-of-year survey.

> In the beginning, TIP training was difficult to get into. I wasn't sure I was using the Space Memory Practice to its fidelity until Day 2 of the Institute. After Day 2 of the institute and hearing about my peers' experience, I felt much better about the implementation of strategies learned. Overall, using the strategies taught will come with practice and I am encouraged to just do it and continue to share with my colleagues. – MPS TIP 2021- 2022 Cohort Member

Social persuasion within the cohort was already beginning on day two.

The following summarizes the key findings in the final summary:
- *After participating in these institutes, 86% of teachers use the design strategies frequently and incorporate them as a standard instructional practice.*
- *99% of teacher participants used one or more of the design strategies learned in TIP Institutes.*
- *97% of teachers who participated in TIP Professional learning Institutes, indicated that the design strategies have proven beneficial to students when implemented.*

Elementary, secondary, and magnet schoolteachers who responded to the survey all reported the applications of new techniques including spaced practice, memory retrieval, association and variation, beginnings and endings, creating a sense of progress, and using small steps/adjacencies based on the review of these strategies during TIP institutes.

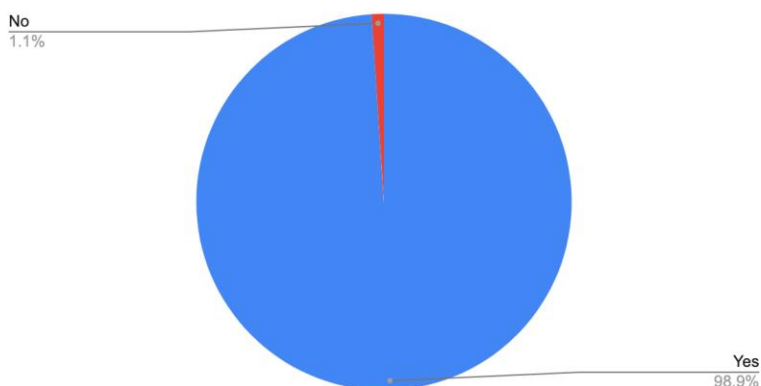The following graphs are from the end-of-year final survey.

Figure 4

Figure 4 showed that 93 of the 94 TLC participants in attendance on the last day had used what they learned in their classrooms. The only participant who had not applied the learning was a librarian.
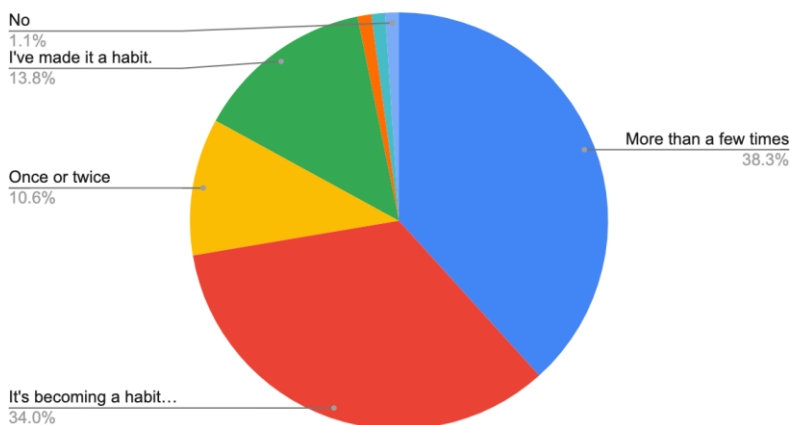

Figure 5

Figure 5 shows that after only four months 14% of the TLC participants had already made at least one of the strategies a habit, 35% were making it a habit and 38% had used the strategies more than a few times.

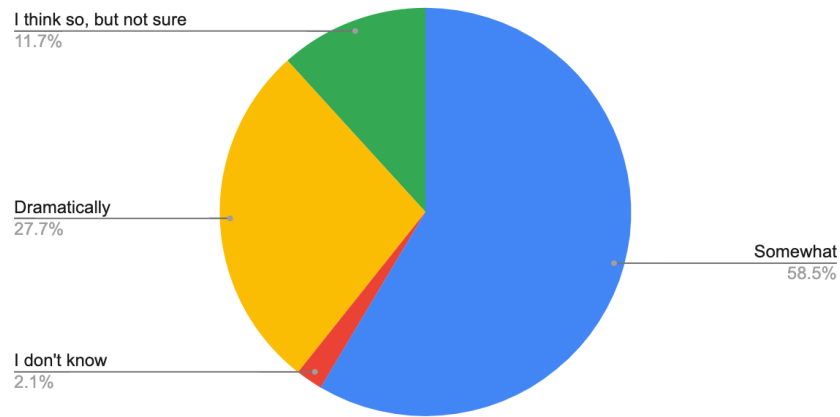Count of The impact of one or more of the strategies was positive.

Figure 6

As shown in Figure 6, by mid-May over 1/4th of the teachers felt that the learning improvement was dramatic, meaning over a letter grade or 10%. Close to 60% felt that there was learning improvement, but it was less than 10% and another roughly 10% believed that learning improved but were not sure. Only 2%, one teacher and the librarian, did not know.

Teachers were encouraged to leave comments and almost all did. These are typical of most of the comments.

- o *[TIP] Is eye-opening. This type of training helps new and old teachers. This forced necessary conversations and made me think. -AA*
- o *[TIP] Is very beneficial for both the teacher and the student. These are strategies that can be used in the classroom as well as in life. -AB*
- o *TIP is awesome! This platform has provided meaningful and engaging strategies. It is wonderful to hear and see all of the wonderful things that other colleagues are doing to improve instruction in their classes. We are truly learning together. This platform has also provided an opportunity to collaborate and have great conversations. I have enjoyed year one. I look forward to next year's cohort. -AS*
- o *Overall, I would say that TIP is a great way to implement continuity to MPS's teacher platform. -TL*
- o *[TIP] Is helpful to teachers, no matter how long they have been in the classroom. -KM*
- o *[TIP] was amazing and built small learning communities that I don't think they even know they created. -MH*
- o *Overall, I would say that TIP is an opportunity to put lifelong learning into practice. -CC*
- o *Is a positive model for holistic, mandatory professional learning for all teachers; this could evolve as a tool that can be used for a interdisciplinary, collaborative instruction - DL*
- o *I would recommend this training to other teachers as it has helped me to network and to connect with materials for instruction in my own classroom on a deeper level outside of just looking for testing results. It has helped me understand how the students think better and not get as frustrated when they forget or lose interest in a lesson. -SF*
- o *This experience has been wonderful. I have seen tremendous growth in my students' data. I have enjoyed the incorporation of art with the design strategies. -AS*
- o *This hands-on participation helps teachers in ways that, while not always intuitive, manifest in practice; this is a great model for how we should approach instruction in the classroom – a "learning experience".* – TIP 2021-2022 Cohort Member

"There is a useful distinction between traditional "professional development" and professional learning, which is intended to result in system-wide changes in student outcomes. Professional development, which happens to teachers, is often associated with one-time workshops, seminars, or lectures, and is typically a one-size-fits-all approach. In contrast, professional learning, when designed well, is typically interactive, sustained, and customized to teachers' needs. It encourages teachers to take responsibility for their own learning and to practice what they are learning in their own teaching contexts." (Scherff, 2018) This professional learning was clearly new to the teachers, or the results would not have been significant. It was activity driven and sustained and gave the teachers agency but at the same time it raises questions about traditional and firmly held beliefs about professional learning."

According to research, high-quality professional learning: (Scherff, 2018)

- is tied to specific content and standards; *This professional learning was not tied to specific content or standards but instead focused on learning principles that cut across grade levels and disciplines.*
- incorporates active learning; *It was activity driven.*
- is job-embedded; *This is questionable. The change model for a school is very much a job embedded model with peers influencing peers but the information coming into the school comes through a series of professional learning days outside the school and with only a few teachers from each school. What constitutes embedded?*
- is collaborative; *The comments indicated that the collaboration was extensive and in this training was built around activities and problem solving.*
- provides models; *Teacher stories were very much a part of the work and the Institutes themselves were designed to be models for classroom practice.*
- includes coaching; *There were no coaches in the professional learning sessions, nor did we work with any in the schools yet all but the librarian were using what they learned in the classroom and roughly 50% had or were turning the principles into habits of practice.*
- is sustained and continuous; *This was sustained and reinforced with school visits.*
- is aligned with school goals, standards and assessments, and other professional learning activities. *This work was aligned with district goals, standards, and assessments. A joint meeting was held with another professional learning supplier but not continued.*

"To involve teachers in high-quality professional learning, leaders must also consider teacher agency, which is the power for teachers to act decisively and positively to better ensure their own professional growth." (Scherff, 2018). The ability for teachers to design their own applications certainly contributed to the success of the program.

Conclusion

Based on the surveys, we conclude that self-efficacy and collective efficacy increased within the teacher learning cohorts. Foundations were laid for collective efficacy in the school but shortening the time span between the first and last Institutes and removing in-person work with the principals did not allow for measurement or pursuit of collective efficacy in the schools. The leading indicators in the change model were successful with the TLC. A positive expectation (affective state) was created by the location and how the first institute began. Task analysis relied on explanations of the sciences underpinning learning. Vicarious experiences were provided by teacher examples from earlier trainings. Mastery experiences occurred during the first day memory activity and were repeated by 72% of the TLC members in their schools. Social persuasion from testimonials by the TLC members pushed this number to roughly 90% the following month. Autonomy or agency was achieved by letting TLC members design their own learning changes and the diversity in applications was substantial and successful in terms of student learning. It is possible to impact student learning without professional learning being discipline specific.

While approximately 80% of the TLC members shared after the first training day, we were not aware of any principal providing an opportunity for them to share school wide. In part this did not happen because once training began, there were no in-person meetings with the principals in a group during which social persuasion could have taken place between principals. In addition, setting school expectations might have helped foster collective teacher efficacy and to our knowledge those were not established during the four months of training.

The data presented in this paper indicates that sustained job-embedded professional learning that when applied can create a sense of both self-efficacy and collective efficacy in the trained group of teachers. The structure of the professional learning followed steps that were already well understood and available to us. The same processes may work in schools without the expense of training the entire staff, without professional learning directed at each discipline, and perhaps without coaching but instead teacher examples and sharing.

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