

CLOSING THE LOOP

Bridging learning and practice for aspiring teachers to successfully implement rigorous, equitable, and inclusive instruction



STORIES AND IMPACT
FROM THE SECOND COHORT
OF THE LEARNING
BY SCIENTIFIC DESIGN NETWORK

Deans for Impact 

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OVERVIEW

As a retired teacher, principal and administrator, Lisa Dunn draws on 38 years of experience in education when she coaches teacher-candidates at Texas Christian University (TCU).

Dunn knows all the ways a lesson can go awry in a student teaching placement, so she wasn't surprised when one of the teacher-candidates she supervised this spring burst into tears when Dunn asked how her 4th grade biology lesson went.

The teacher-candidate explained that she had given the kids an example of the intricate relationships among energy producers and consumers in a food web: Eagles sometimes eat owls.

But once she'd planted that graphic image in the kids' minds, it's all they wanted to talk about. She couldn't budge them off of it and move on with the lesson.

Dunn then reviewed what the teacher-candidate had learned in class about providing students with examples that focus attention on the meaning of a concept as well as non-examples that clarify what a concept is not.

"It was a great conversation," Dunn said. "The next time I observed her, she had great examples, so she learned."

The College of Education at TCU is one of four teacher-preparation programs that participated in the second cohort of our [Learning by Scientific Design \(LbSD\) Network](#), which supports teams of teacher-educators to close the loop between learning and practice.

Too often, gauzy promises to improve teacher learning do not lead to measurable increases in teacher knowledge and skills, reinforcing the perception that it's too difficult to change teacher-preparation programs.

But empirical data from our network showing gains in teacher-candidate knowledge and skills – and the lived experiences of teacher-





candidates, clinical supervisors, faculty and deans who participated – directly refute that perception.

We achieved those results by working closely with faculty, clinical supervisors, and deans to adopt a coherent set of ideas, practices and common definitions grounded in [the science of learning](#). These efforts helped to create greater alignment across a teacher-candidate's journey in the program, connecting what they learned in courses to what they enacted in their clinical experiences.

Dunn and the teacher-candidates she supervises now share a common language grounded in the science of learning and how to apply it in the classroom, which makes it easier for her to give actionable feedback.

"Any time I'd get a job reference or a call for one of these kids, I'd say: man, they're like a third-year teacher in my book," Dunn said.

This is the power of programs [closing the loop between learning and practice](#).

A coherent set of ideas and practices

The LbSD Network launched in the fall of 2019 with six teacher-preparation programs that wanted their graduates to understand (and apply in the classroom) basic principles of attention, memory and learning distilled from the most reliable and time-tested findings in cognitive science. With support from DFI, these programs set out to design more rigorous, equitable and inclusive learning environments for all students, especially those who historically have been excluded from meaningful instructional experiences.

A second cohort of four programs joined the network in the fall of 2020 in the midst of the COVID-19 pandemic.

Those programs – Sam Houston State University in Huntsville, Texas; Texas Christian University in Fort Worth, Texas; National Louis University in Chicago, Illinois; and the University of Alaska-Fairbanks – together prepare nearly 4,800 teacher-candidates annually.

LbSD Network | Snapshot of Cohort 2

Educator-Preparation Programs

UAF UNIVERSITY OF ALASKA FAIRBANKS

SH Sam Houston State University

TCU Texas Christian University

NATIONAL LOUIS UNIVERSITY

47

participating faculty and clinical supervisors

Nearly 4,800

teacher-candidates prepared annually across programs

Our first step with programs in the second cohort toward closing the loop required collecting baseline data establishing what teacher-candidates already knew about the science of learning.

An assessment we developed, as well as our reviews of classroom videos and lesson plans, revealed that students in both network cohorts needed the most help grasping two principles:

- **Deepening meaning and learning:** Students should think about meaning when they encounter to-be-remembered material.
- **Connecting the dots:** Students learn new ideas by reference to ideas they already know.

We brought coursework faculty together with clinical educators to consider how and when candidates were learning about these core ideas and four related **practical teaching actions**:

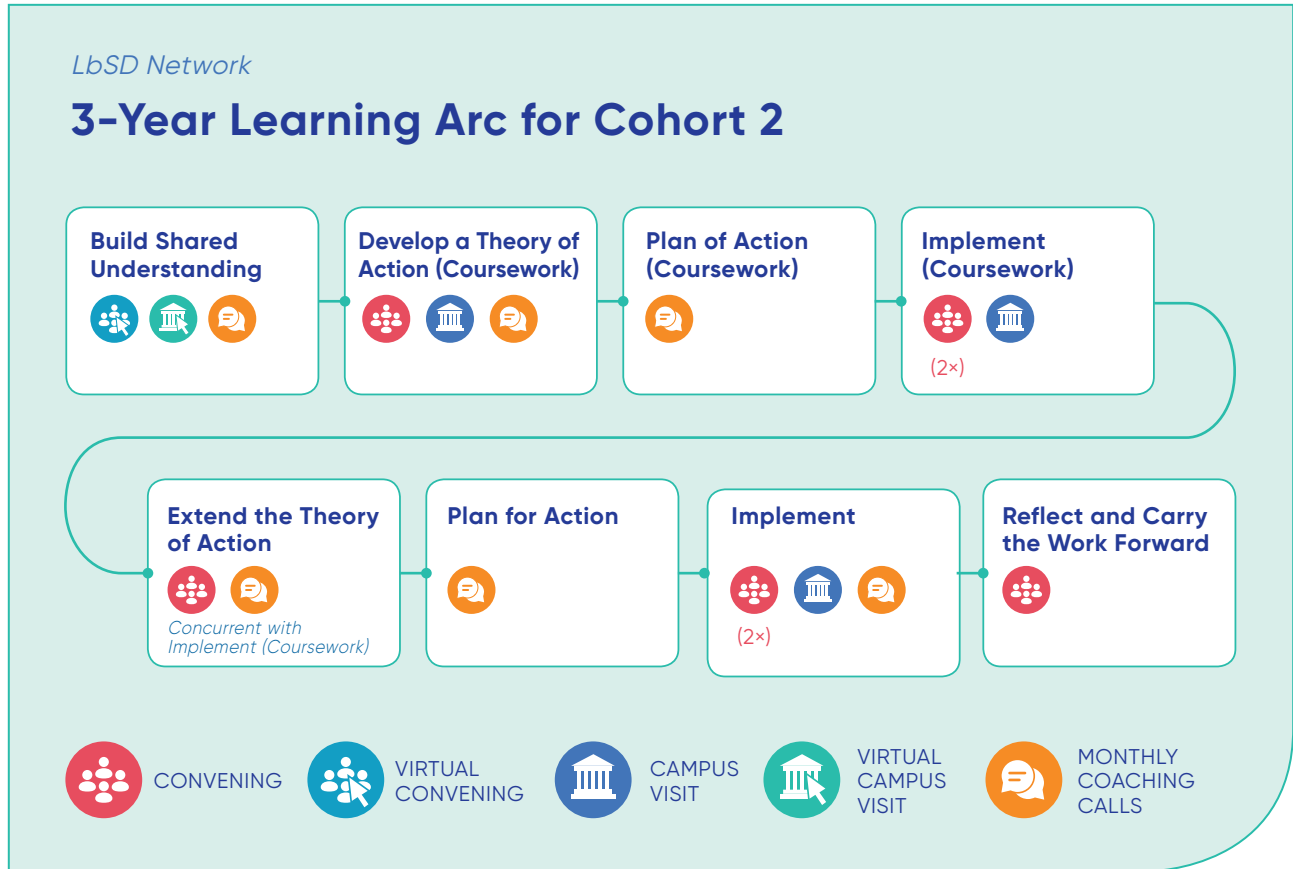
Focusing student attention on meaning

Prompting connections to prior knowledge

Prompting for effortful thinking

Using examples and non-examples

We helped them redesign the sequence of courses in ways that offered teacher-candidates a truly scaffolded set of learning experiences and provided instructional materials that faculty could modify and incorporate into their existing courses.



Actionable feedback

Professors at the beginning of a teacher-candidate’s journey typically aren’t able to see for themselves whether their students can apply what they’ve learned in the field, and those supervising their teaching at the end of the program often aren’t privy to what they have learned in their coursework.

To close the loop between what they had learned in their courses and what they were able to apply with real students in a real classroom, we brought together professors and clinical supervisors to analyze lesson plans and videotaped lessons of student teaching placements.

After we provided professional learning and coaching to the clinical supervisors around how to effectively deliver feedback to teacher-candidates, program teams met with teacher-candidates to discuss the feedback.

Julia Lewis, a teacher-candidate at TCU, said her evaluation team reviewed a reading lesson she had taught for a bilingual kindergarten class.

Her team noticed her reluctance to use examples and non-examples to clarify concepts and gave her constructive feedback on how she could improve keeping her students' attention focused on the most meaningful information they needed at each step of the lesson to reach the learning goal.

Lewis said she had initially thought the kids were just not picking up on what she was explaining. She didn't recognize how much deficit language she was using to explain why the lesson had not gone well until it was made explicit in the feedback from her evaluation team.

It was a powerful moment of accountability that Lewis took to heart, and she returned to her classroom determined to do better.

In a subsequent lesson about punctuation, she used examples and non-examples to explain the difference between a period and an exclamation point. Then she gave an example of a sentence about something exciting, and asked the class if she should put a period at the end.

The kids seized the chance to teach the teacher and eagerly explained why the sentence needed an exclamation point, not a period.

She had created a learning experience with examples and non-examples that gave the students ownership of the knowledge and a deeper understanding when they explained it back to her in their own words.

"It was really eye-opening that the first time I tried it, it worked," Lewis said. "I'm no longer thinking: oh, it's just the kids. I'm saying it well enough; they're just not picking it up."

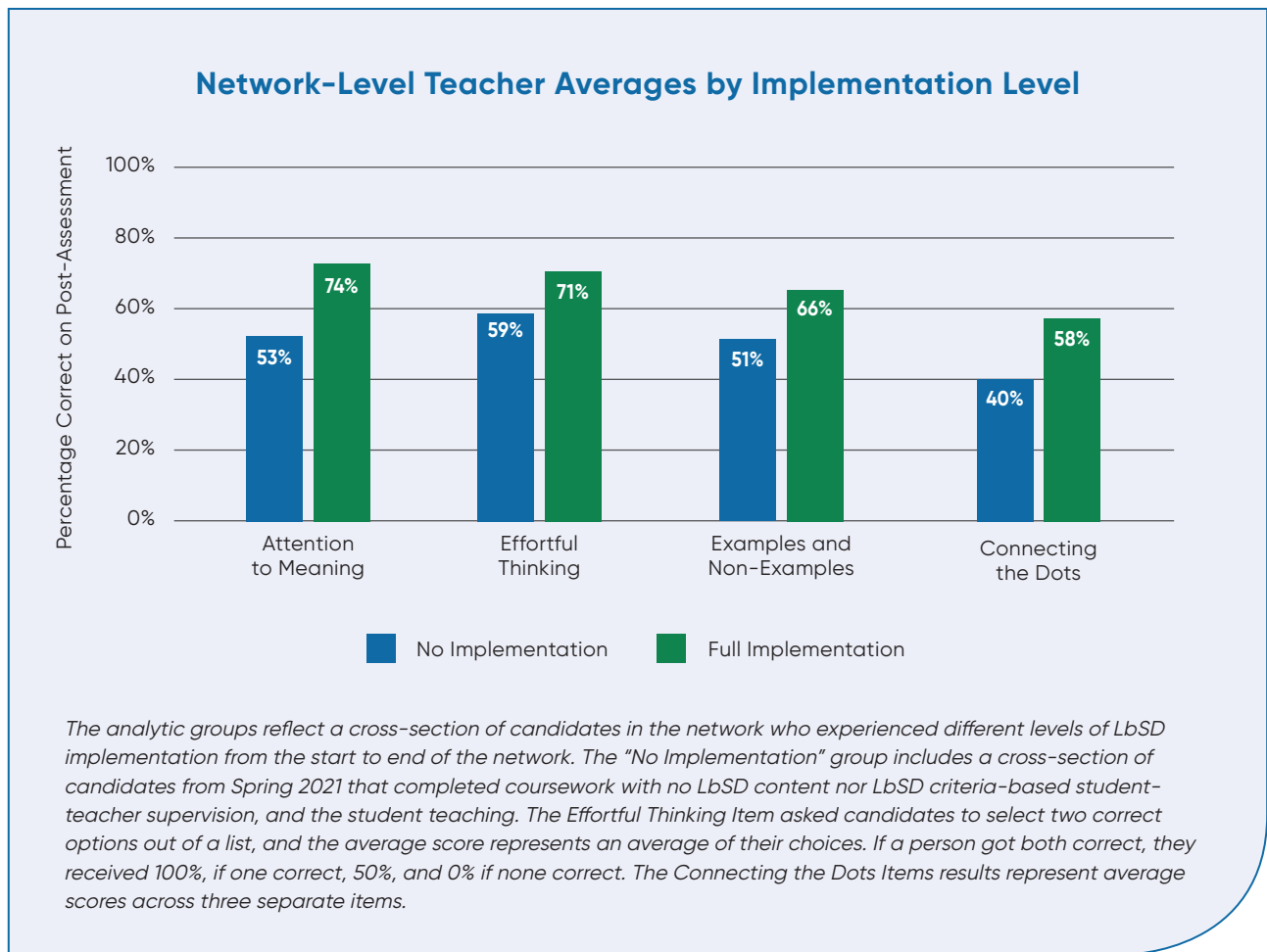


Closing the most important loops

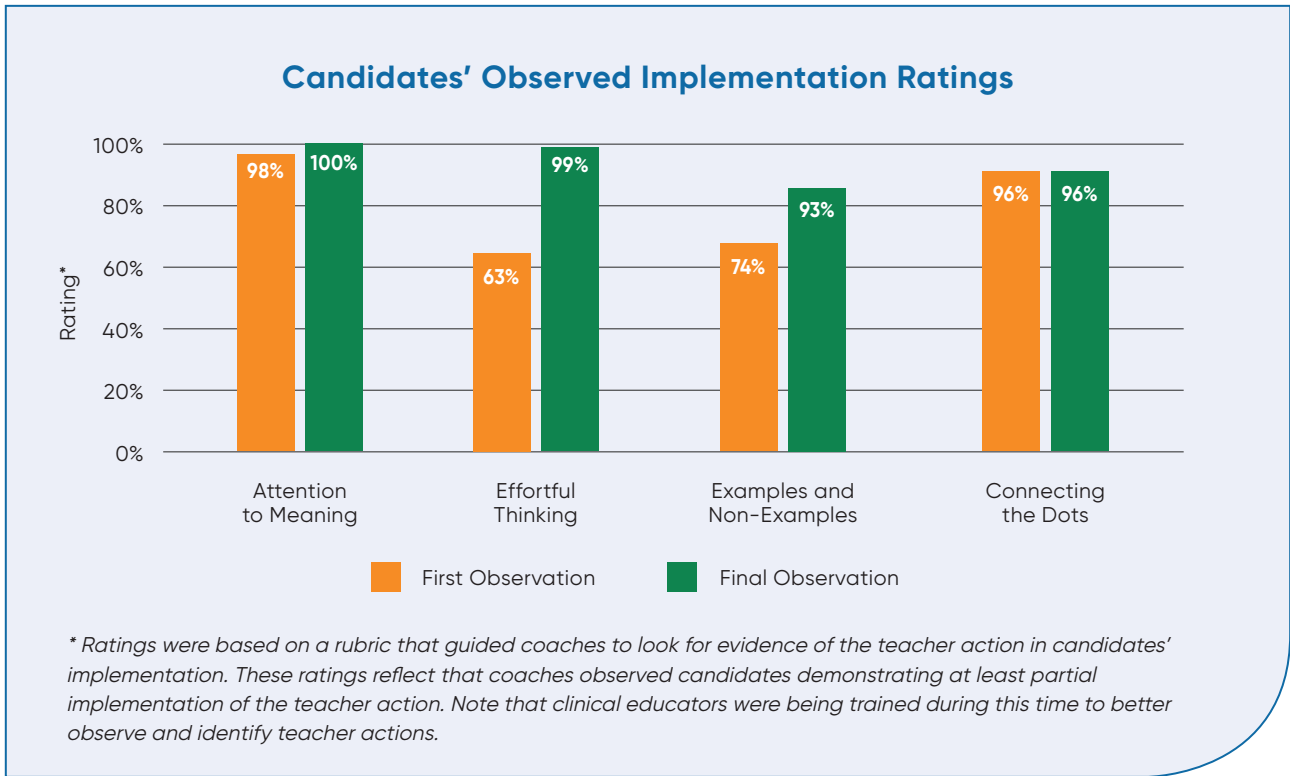
The school districts that hire Sam Houston State University graduates are impressed with their maturity and competence, said Stacey Victor, dean of the College of Education.

“They don’t look and sound or behave like brand new graduates,” she said. “They look and sound and behave like second-year teachers who know what they’re doing and are ready to really have a positive impact on kids.”

We have evidence that teacher-candidates achieved measurable increases in teacher knowledge and skills, proving that change is possible and worth the effort. Those exposed to the full course of our training did better than those with some exposure, who in turn did better than those who haven’t received any training yet.



Clinical educator observations also suggest teacher-candidates demonstrated they could apply what they had learned. For example, on their first classroom observation, 63 percent of teacher-candidates demonstrated at least some evidence of prompting for effortful thinking, compared to 99 percent of teacher-candidates on their final observation.



As a new special education teacher who received our training, Andrea Highberger is excited to have the knowledge and skills to make instructional choices that effectively support her students' learning goals.

She will have the confidence to explain those evidence-based choices to parents clearly with the kind of detailed feedback she wished she had received from her own children's teachers.

"I've gotten so many gauzy promises," said Highberger, who graduated from National Louis University this spring with a master's degree. "That's why I became a teacher. My daughter was my inspiration to make that change and do what I can."

She said established teachers she worked with during her student teaching placements were interested in learning more about the skills and knowledge she brings to the profession that they didn't receive in their own preparation programs.

"I'm excited for the future as more and more teachers graduate with these skills," Highberger said. "If we have teachers who are teaching our students with scientific design, then it can, in turn, impact society positively, which we need right now, especially in America."

Keep reading to explore how faculty, clinical supervisors, and deans in the LbSD Network re-imagined and aligned their roles to improve the learning experience for teacher-candidates from the classroom to their culminating clinical experiences.



A DEEPER LOOK FACULTY

The first meeting Professor Daphne Johnson attended about the LbSD Network left her frustrated and wondering if this was just another educational gimmick that would come and go.

Her employer, Sam Houston State University, required Johnson's participation because of her background in reading instruction and educational psychology. Yet much of what she heard at that first meeting sounded unfamiliar.

"I didn't understand what they were talking about," she said. "I sat through it and I thought, oh, this is awful. I hate this."

But once she saw how much our training deepened her students' thinking, she was sold.

"Now I can't get enough of this stuff," Johnson said. "There's some component of it in any class I teach because I see how valuable it is and how much it's needed by our students."

We helped Sam Houston State University and other programs redesign teacher preparation around a coherent set of ideas, practices and common definitions grounded in the science of learning that provided teacher-candidates with a consistent learning arc from their first courses to their final clinical experiences.

The transformation included instructional materials on the science of learning we developed and integrated into existing coursework, modifying them in collaboration with the professors who taught those courses.

Our materials covered both theoretical understanding of learning science principles, and applied understanding of those principles with specific teaching actions.



"It's very concrete. They've put it in a way that's very manageable and very direct," Johnson said.

She could tell her students weren't just parroting concepts they didn't really understand.

"There's a deeper connection," Johnson said. "You can ask an open-ended question, give them time to think about it, and they can come up with a really meaningful answer that in the past would have been a very shallow answer. It just blew me out of the water when I really stopped and just listened to not only what they were saying, but how they were saying it, and where it was coming from. It was really cool."

Walking the walk

Embracing the science of learning required faculty to redesign their courses and sequences of courses. We worked with them to modify our materials so that they made sense within the context of their syllabi.

We also collaborated with faculty to collect data on how well teacher-candidates were learning from the new instructional materials and used that feedback to retool the courses to make them even stronger.

There is still room for improvement and iteration. Smoothing the transition from conceptual understanding to practical application in a real classroom remains a challenge throughout the network.

Professor Leah Brown at the University of Alaska-Fairbanks observed this disconnect between learning and practice with some of her teacher-candidates when participation in the network was ramping up and clinical supervisors hadn't yet been trained.

"I wasn't seeing them implement the learning science teacher actions," Brown said.

She realized the teacher-candidates needed more timely feedback on how well they were applying what they learned, so she had them submit short videos (10 to 15 minutes) along with their lesson plans. Then she coached them on a few of the most important things they could do better.

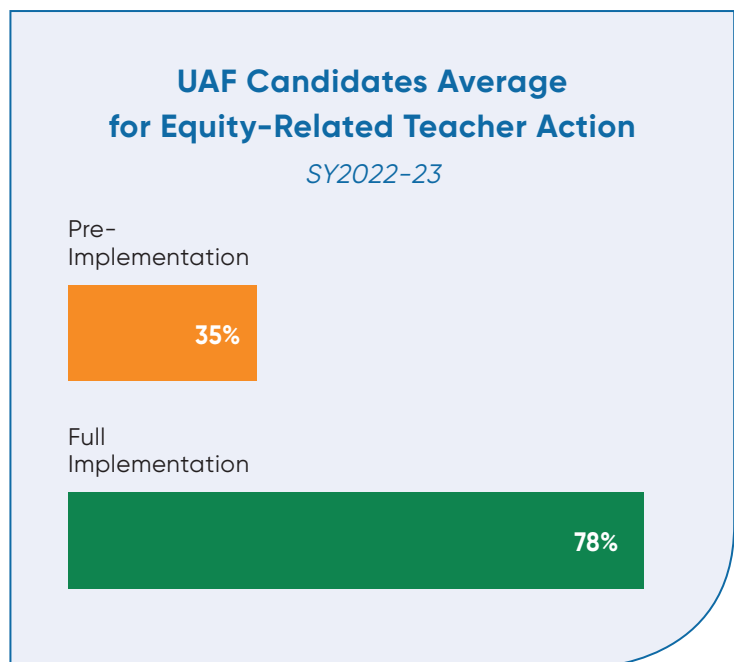
She recalls one session that focused on what it means to make sure all students have equitable access to rigorous material.

The teacher-candidate thought she was involving the whole class in the discussion, but the video showed a different story.

"You can see the back-row kids goofing off, or sleeping or on their phones," Brown said. "The teacher is up there just teaching her heart out with one or two students."

The emphasis on equity is paying off.

When forced to make a choice between two different instructional decisions in a lesson scenario, 78% of teacher-candidates at UAF who experienced revised coursework that integrated principles of learning science chose the more equitable option for students in the scenario, compared to 35% of candidates at UAF who made that same choice before any coursework revisions.





Modeling best practice

Back in Texas, Daphne Johnson said she scrutinized her own teaching practice in light of the science of learning principles she wanted her teacher-candidates to know.

“My own classes changed and I dropped a bunch of things I was doing that I thought were the best activities in the world because they were useless,” Johnson said.

For example, she used to have students design their own preschool-age toy from recycled materials and talk about how their toys related to some principle of development. But she realized way more time went into building the toy than talking about its relevance to the goals of the lesson, so she dropped that activity.

Activities that focus students’ attention and cognition more on the arts project than on the clear learning goal in an attempt to make the lesson “fun” do not focus attention on meaning or provide rich opportunities to prompt effortful thinking, two of the four teaching actions that Johnson, and her colleagues across the network were learning about and implementing with their teacher-candidates.

Johnson wants her teacher-candidates to understand that a better way to make lessons more engaging is to create equitable opportunities for all students to think effortfully, which makes their learning more durable and enjoyable.

Students who experience the gratification of deep learning are more motivated to experience it again.

A DEEPER LOOK CLINICAL SUPERVISORS

The LbSD Network relies on interlocking feedback loops that help teacher-preparation programs determine whether their teacher-candidates can apply what their professors say they have learned.

Nowhere is that feedback more important than during the student-teaching placements when candidates must translate what they have learned into practice with real kids.

Clinical supervisors observe and coach teacher-candidates during those placements. They serve a crucial role by confirming whether teacher-candidates understand science of learning concepts well enough to create equitable learning environments for real children in real classrooms.

But clinical supervisors often come in near the end of a teacher-candidate's journey, an institutional hurdle that makes it more difficult for them to know what professors have done earlier in the process.

We provided feedback about trends we saw across the network and discovered that the clinical supervisors needed more specific feedback on how well they were coaching the teacher-candidates, customized to the needs of four programs with different structures and timelines.

Coaches need coaching, too

Shandra Johnson, a clinical supervisor at Texas Christian University (TCU), appreciated that we brought core professors and clinical supervisors together to assess teacher-candidates using the same terms and expectations.

"It was very eye-opening on both sides," Johnson said.

We also observed clinical supervisors coaching their teacher-candidates and offered feedback.

"We need coaching as well," said Anita Ruffin, another TCU clinical supervisor. "It helps when we can role-play."

A retired teacher with 32 years of experience, Ruffin said she was not sold at first on the science of learning approach and worried it might be yet another



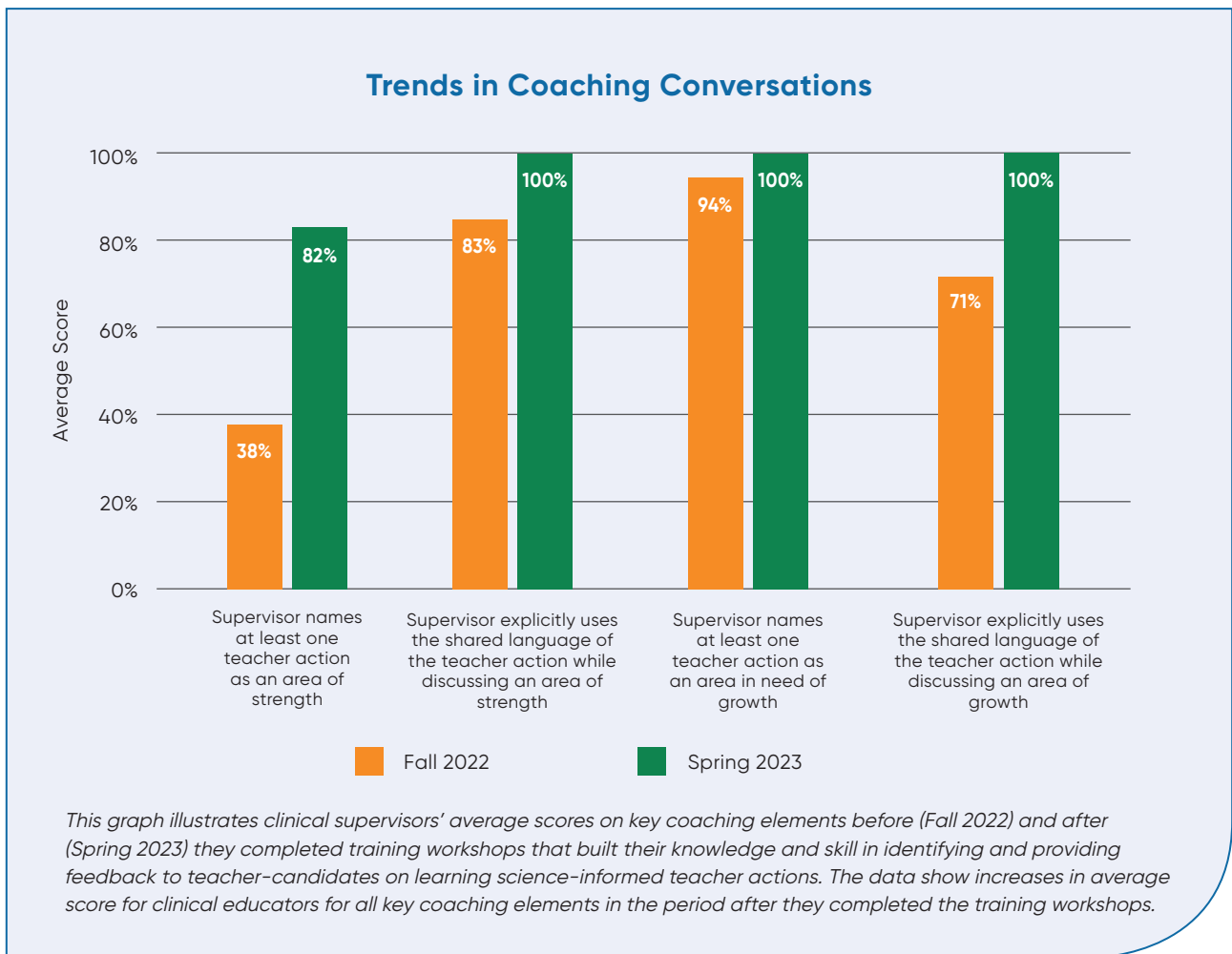
educational fad: “I probably had kind of a sour look on my face because I was wondering, what is this? Is this soup warmed over again?”

But listening to one of her teacher-candidates talk about how she wanted to encourage more effortful thinking in her classroom motivated Ruffin to become a better coach.

“It kind of prompted me to want to dig further and want to really understand what she understood,” Ruffin said. “For me, this semester really kind of tipped the scale and made me have that appreciation for the things they were trying to get me to understand at the very beginning.”

One of the key components of our work with clinical supervisors was helping them recognize **effective methods** for providing candidates with focused feedback. We supported them to learn and implement four elements of strong coaching conversations.

Over the course of the SY22–23 school year, we saw notable improvements:





Better reflections and insights

Out of the dozen teacher-candidates that Lisa Dunn supervised for TCU this spring, three students were involved in different programs and did not receive our training.

Dunn noticed a big difference in the quality of coaching sessions she could have with students about their lessons.

The nine students who received the science of learning instruction could reflect on what they were doing in the classroom with deeper insight than the three who didn't.

"They were quick to find their own areas of improvement because they were attuned to it," she said.

Dunn said she's used other evaluation methods with longer lists of strategies that give teacher-candidates a lot to keep in mind when they're just starting out.

She said focusing on the four teacher actions at the heart of the LbSD Network empowered teacher-candidates to apply what they had learned confidently without feeling overwhelmed.

"To give them four powerful things to hang their hat on makes such a difference," she said.

A DEEPER LOOK DEANS

During his interview process to become the new dean of the College of Education at Texas Christian University (TCU), Frank Hernandez was asked what he thought about Deans for Impact.

TCU had recently joined the LbSD Network and wanted to be sure that the next leader agreed with this new approach to teacher preparation.

They had no need to worry. Hernandez was one of our founding deans and a board member to boot.

Once deans commit to the LbSD Network, they must foster buy-in among their faculty and staff in the work to shift long-held knowledge, skills and mindsets. The work of closing the loop between learning and practice requires all hands on deck.



Not just an add-on

That work began at TCU by assuring the faculty that this wasn't just a canned curriculum tacked onto their already busy schedule.

"The biggest challenge was framing it in a way that it wasn't something peripheral to the work that we are doing," Hernandez said. "This is something that you integrate into your own thinking and something that you model for the teacher-candidates within the content of your course."



We worked with the faculty to blend science of learning principles and the teacher actions to apply them into their existing pre-K through 6th grade curriculum.

"The real buy-in occurred once they began the coaching calls with the DFI team and looking at the data," said Jan Lacina, Associate Dean for Graduate Studies. "In all of their coaching sessions, I felt like they really provided opportunities for faculty to make decisions about their class and about our program as a whole."

Hernandez made it clear that the new direction wasn't just another passing fad. Faculty would need to learn new skills and drop less effective lessons and activities.

"Faculty who are trained and who are integrating the science of learning into their courses are the faculty who are going to be teaching our teacher-candidates," Hernandez said. "So, if this is something you're not interested in doing, then you probably will not find yourself working with our teacher-candidates."

Non-negotiable experiences

The buy-in for the LbSD Network at Sam Houston State University grew organically, said Stacey Victor, dean of the College of Education.

She began by engaging a group of teacher-candidates in a small pilot program. At first, they grumbled a bit about the extra time and effort it took.

But "by the end of that experience, they were our number one salespeople," Victor said. "They came back and said: this is the most amazing experience I've ever had. This really prepared me to be a teacher in ways that no other experience would have done."

She said the faculty was sold after the first data collection comparing before and after results.

"It only took that very first time for it to click and [for them to] say, 'oh my, this works. It makes a difference.' That's when people buy in," Victor said.

Meanwhile, the university was replacing the traditional model of student-teaching with a year-long residency in partner school districts designed to make students feel more invested in the life of the school and less like a guest.

"It gives them a more in-depth and a more enriched vantage point for what it means to be a teacher," Victor said.

The residency also provides a more seamless structure to ensure that mentor teachers in the schools agree with the LbSD approach. In traditional student-teaching placements, mentors sometimes give conflicting advice.

"We were building the residency when we first got involved with Deans for Impact so they really aligned," Victor said. "They happened at the same time."



With better feedback at every stage of a teacher-candidate's journey, faculty can build on the lessons that work and eliminate the ones that are less effective.

Sam Houston State University works with many partner districts. Though all welcomed the new emphasis on the science of learning, a few weren't comfortable with the residency model and no longer work with the university on student teaching placements.

"This is not the area where we'll compromise," Victor said. "We have lots of ability to be flexible and nimble, but this is non-negotiable because it's too important an experience for them."

The remaining partner districts are committed to providing meaningful and consistent experiences for teacher-candidates.

"The biggest challenge is staying the course, ensuring that we have built in processes and people for it to be sustainable," Victor said.

RELATED TOOLS AND RESOURCES

Access instructional tools and materials produced through our LbSD Network:

[Teacher Action Anchor Charts](#)

These resources provide teacher-educators with overviews of teacher actions informed by the science of learning.

[Coaching Tools](#)

These resources provide clinical educators with tips for coaching and observing novice and aspiring teachers.

[Instructional Modules Overview](#)

These modules provide practice-based, actionable learning opportunities for teachers and those that prepare them.

For additional materials or to learn more about our work, visit

www.deansforimpact.org

We are very grateful to work with the faculty, clinical supervisors, deans, and staff at National Louis University, Sam Houston State University, Texas Christian University, and the University of Alaska-Fairbanks who are leading incredible efforts through the Learning by Scientific Design Network to redesign clinical experiences and coursework so that teacher-candidates are better prepared to support their students.