Exploring Job-Embedded Professional Learning in Rural Schools

March 2021

Introduction and Rationale

To significantly contribute to student learning, teachers must have the requisite content, and pedagogical content knowledge to improve student interest and learning in science, technology, engineering, and mathematics (STEM) (Shulman, 1987). Stand-alone workshops that attempt to remediate the lack of knowledge or strategies teachers need are not sufficient, rather job-embedded, collaborative professional learning experiences beginning as early as teachers' preservice years that sustain throughout their career trajectories are promising ways to prepare and support teachers as they face today's challenges and prepare students for the future (Dimock, 2017). Teachers report that learning from other teachers and observing other teachers are characteristics that make professional learning most valuable (Zhang, Parker, Koehler, & Eberhardt, 2015).

One of the factors contributing to the attrition of STEM teachers is the lack of a collaborative environment to foster teacher growth and learning. Research shows clear benefits for teachers when they have opportunities to work and make decisions together with their colleagues within a culture of teamwork (Park, Henkin, & Egley, 2005) and with a sense of collective responsibility (Leithwood & Poplin, 1992). Additionally, collaborative work environments and learning networks create opportunities for teachers to build knowledge to improve instruction, ultimately leading to higher student achievement (Datnow, Park, & Kennedy-Lewis, 2013). Teachers who are not provided with these types of collaborative opportunities for professional growth and affirmation with their colleagues can be left feeling inadequately supported or uncertain about their practice.

The National Academies of Sciences, Engineering, and Medicine *Changing Expectations for the K-12 Teacher Workforce: Policies, Preservice Education, Professional Development, and the Workplace* reviewed the literature and reports:

> Workplace opportunities for teacher learning now commonly include induction and mentoring for new teachers, time to collaborate with peers, and instructional coaching in key subject areas and for purposes of data-driven decision making. However, decades of research on the school workplace confirms that schools vary widely in the tenor of the workplace culture, the vision and skill of school leadership, the availability of high-quality PD, the norms and routines that mark teachers' professional relationships, and the systems that provide structure and guidance for teachers' work with students. Empirical research on the three specific strategic interventions of induction and mentoring, collaborative time, and instructional coaching has yielded mixed results, suggesting that a fruitful question is under what conditions each of these interventions proves effective in retaining teachers, stimulating instructional improvement, and boosting student learning. (National Academy of Science, 2020 pg. 179)

Rural teachers have limited resources and professional development options (Hickey & Harris, 2005; Howley & Howley, 2005). Large suburban and urban schools typically have STEM departments. Individuals in these positions have content expertise, and they assume leadership roles in providing guidance to all staff, especially new teachers and discipline-based educators. Unlike large high schools, rural high schools have few STEM teachers, and many schools have only one science or mathematics teacher. Without department chairs or content specialists, rural secondary STEM teachers often become the de facto leader in transition planning in addition to performing multiple teaching and leadership roles (Li, 2004). Few individuals in rural high schools have the pre-service training or expertise to lead and support transition education and services (Kochhar-Bryant, 2003; Morningstar, Kim & Clark, 2008).

Isolation can be challenging for many rural teachers. The lack of opportunities to connect with and learn from peers takes away one of the greatest professional learning opportunities teachers have—each other. Professional development that might offer the opportunity for rural educators to convene and connect with others has some drawbacks. In person face-to-face professional development opportunities can be as much as four to six hours away. Some districts might have only one or two substitutes, making it impossible for a group of teachers to attend a training or to go for multiple days. Rural teachers are often offered one-time, sit-and-get professional development that often doesn't prove effective, provide time for implementation, or allow teachers to build relationships with one another.

The National Survey of Science and Mathematics Education (NSSME) revealed professional development disparities between rural and urban schools (Banilower et al., 2012) as rural districts face significant challenges in providing teachers with high-quality professional development. The national average for the percentage of rural schools across the country is just under 33%. During the 2010-11 school year, over 20% of the nation's total public-school enrollment of nearly ten million students was in rural districts. Meeting the needs of these children is a challenge and an obligation that demands and deserves the nation's attention. Isolated rural locations have a high concentration of children in poverty and African American, Native American, or non-white Hispanic students (Williams, 2012).

One of the guiding principles of the new vision for science education in the Next generation Science Standards is promoting equity. All students must have access to high-quality learning opportunities in science (National Research Council, 2012). It is clear that effective, sustained, professional learning experiences in science for teachers are needed. Many children and their families in rural America need better and more equitable educational opportunities. The challenges students face in many rural places are staggering: Limited access to advanced coursework, medical care, food and employment opportunities, continue to daunt students in many rural communities. Poverty rates are also climbing. (Lavalley, 2017).

In rural schools, it is particularly difficult for STEM teachers to access and implement research-based practices due to a lack of professional development and limited interactions with colleagues with expertise. Online professional development can alleviate these challenges by virtually connecting rural STEM teachers with both higher education institutions and rural peer teachers as they learn about, discuss, and implement research-based teaching strategies.

Our project team set out to find creative ways for rural STEM teachers to connect with and learn from one other using job embedded professional development designs. Job-embedded professional growth opportunities refer to teacher learning opportunities that take place during the contracted school day and are grounded in the context of classroom teaching practice. Teacher collaboration is essential for effective job-embedded professional development. Collaboration allows for the problem solving and evaluation of problems of practice to improve teacher quality. Ensuring that teachers are able to participate in meaningful and collaborative working groups is one of the key elements to meeting professional needs for continuing growth.

In order to make recommendations regarding how rural STEM teacher professional development might be embedded in the school day, it was important to gather information on what is already happening in the field. The project team developed and distributed a survey to teachers and school leaders designed to better understand the current state of professional learning opportunities in rural schools/districts and the challenges/barriers to implementing such opportunities.

Methods

The data in this cross-sectional survey research study were collected using an online survey, through Qualtrics, with closed and open-ended items. We developed the 20-item survey to investigate (a) teachers' and administrators' perceptions of the job-embedded nature, quality, and culture of professional learning in their rural schools; (b) features of impactful professional learning in which teachers had previously participated; and (c) challenges to and supports needed for implementing professional learning opportunities in rural areas. The survey was administered via e-mail to the 100Kin10 Rural Micro-Network and the 100Kin10 Teacher forum, and responses were collected from July through September 2020. The survey is included in Appendix A.

Participants

The 100Kin10 Rural Micro-Network is a nation-wide community in the 100Kin10 network that live, work, or care about STEM education in rural contexts consisting of 116 members. The 100Kin10 Teacher Forum in 2020 consisted of 74 teacher leader members who conducted listening sessions with educators across the country in order to gain valuable insights about how teachers are experiencing STEM education in their local contexts. These groups were contacted by e-mail explaining the purpose of the survey and asked to take the survey themselves if they were a teacher or administrator, and/or to forward it on to their own networks. Note that given this method of survey distribution, we were not able to determine the number of people asked to complete the survey and thus cannot calculate a response rate.

Table 1. Survey Respondents by Role

Role	#	%
Teachers		
Teachers	452	78%
Other educators	44	8%
Administrators		
District administrator	41	7%
Building/campus administrator	18	3%
Curriculum director/instructional leader	12	2%
I do not work for a school or district	13	2%
Total	**580**	**100%**

A total of 580 participants responded to the survey. The majority of respondents were teachers (N=452), followed by other educators (N=44; e.g., paraprofessionals, retired teachers, counselors) and district administrators (N=41). A few respondents indicated that they did not work for a school or district and were not asked to continue the survey. Table 1 shows the total number of respondents broken down by their roles as indicated on the survey. For analysis, teachers included respondents who identified as teachers or other educators, and administrators included respondents who identified as district administrators, building/campus administrators, or curriculum directors/instructional leaders.

A total of 395 respondents provided additional information about their demographics. As shown in Table 2, the majority of respondents were female (76%) and identified themselves as white (86%).

Table 2. Survey Respondent Demographics (N=394)

Gender	
Female	76%
Male	22%
Prefer not to answer	2%
Race/Ethnicity	
American Indian or Alaska Native	3%
Asian or Asian American	2%
Black or African American	2%
Hispanic or Latino/a	6%
Native Hawaiian or Other Pacific Islander	1%
White	86%
Other	1%
Prefer not to answer	5%

Respondents represented 22 different states (see Figure 1), the majority residing in Texas (N=194) and Kansas (N=133) due to the researchers' well-established contacts with teachers and administrators in these states. As shown in Figure 2, almost all respondents indicated that they were from rural (65%) or town (27%) communities. Those who reported teaching in city or suburban communities were not included in further analyses, as our target population for this study was rural communities.

Figure 1. Number of Respondents Per State (N=395)

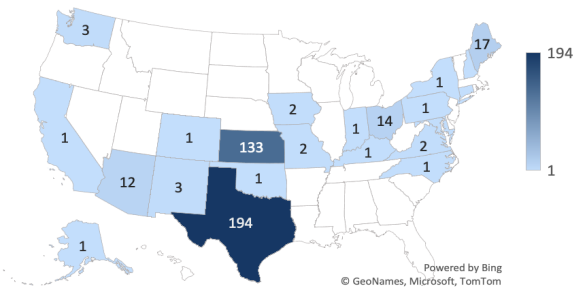
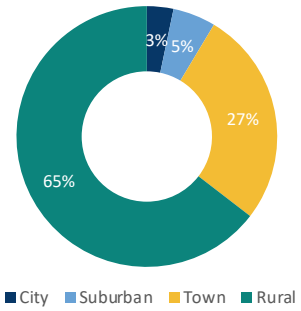


Figure 2. Type of Community (N=395)

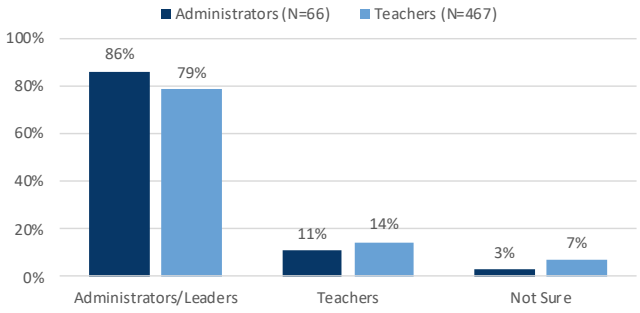


Survey Findings

Decision Making about Professional Learning

Teachers and administrators were both asked who was most responsible for making decisions about professional learning in their schools and/or districts. As shown in Figure 3, a large majority of administrators and teachers said that administrators and curriculum/instructional leaders were most responsible. Some administrators and teachers reported that teachers were most responsible for professional learning decisions in their schools, and a few respondents were not sure who made such decisions.

Figure 3. Administrator's and Teachers' Perceptions about Who Makes Decisions about Professional Learning



Job-embedded Nature of Professional Learning

Teachers and administrators were asked about the extent to which they agreed or disagreed with statements about the job-embedded nature of professional learning in their school or district. As shown in Figure 4, the majority of teachers agreed or strongly agreed that most of their professional learning opportunities were one-time events or seminars (83%) and occurred outside of the school day (67%), two features that are not often considered job-embedded or high-quality professional development. Only about half or less than half of teachers agreed or strongly agreed that they were given time to participate in professional learning during their day-to-day work

(50%), had input about what and how they learned (42%), and had access to instructional coaching (51%). While most teachers (71%) agreed that they regularly collaborated with other teachers to improve their teaching, few actually had regular time in their schedules for this collaboration (38%).

Administrators' perceptions depicted teacher professional learning as more job-embedded than did teachers' perceptions. As seen in Figure 5, a small majority of administrators agreed or strongly agreed that most professional learning occurs outside the school day (51%) at one-time events or seminars (60%), statements which teachers tended to more strongly with. In contrast with teachers, most administrators agreed or strongly agreed that teachers have input about what and how they learn during professional development (86%) and have access to instructional coaching opportunities (73%). Additionally, many administrators believe teachers regularly participate in professional learning during their day-today work (69%) and are provided time in their schedules to collaborate with other teachers in their subject area (68%). Administrators only responded similarly, although slightly stronger, to teachers in their agreement that teachers regularly collaborate with colleagues to improve their teaching (78%).

Figure 4. Teachers' Perceptions of Job-Embedded Nature of Professional Learning

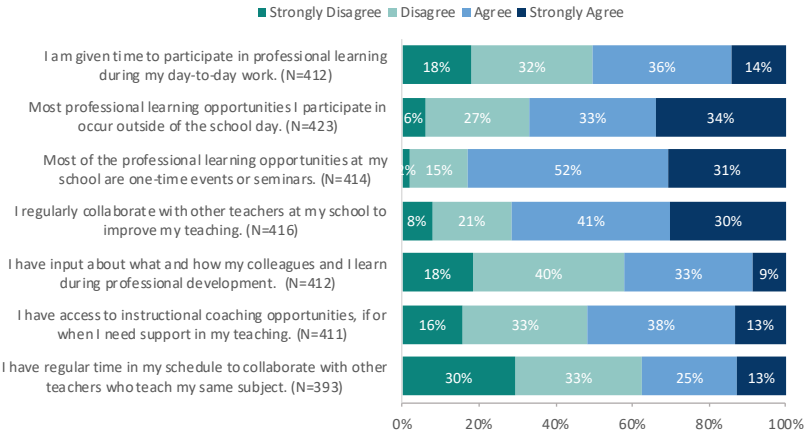
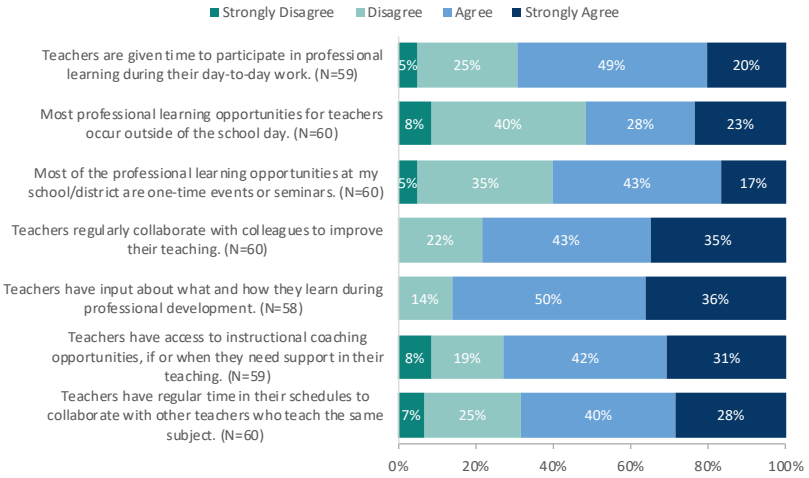


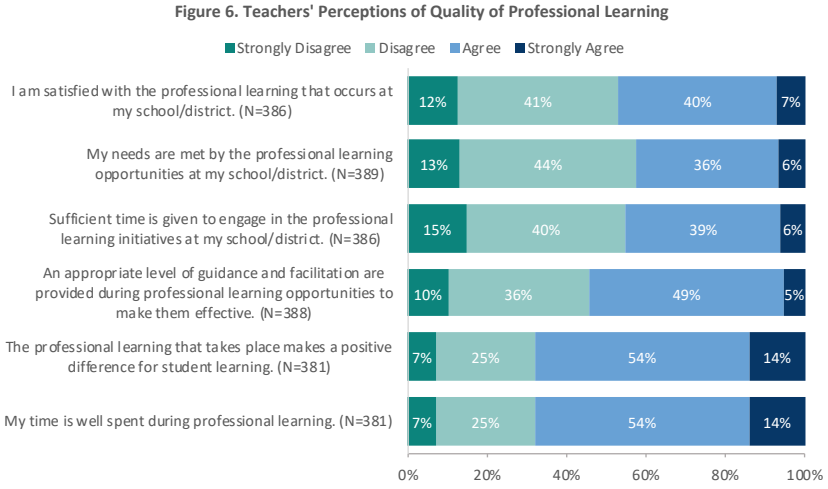
Figure 5. Administrators' Perceptions of Job-Embedded Nature of Professional Learning



Quality of Professional Learning

Teachers and administrators were asked to rate their level of agreement or disagreement with statements about the quality of professional learning that teachers receive. As seen in Figure 6, most teachers agreed or strongly agreed that the professional learning in which they participate has a positive impact on student learning (68%) and their time is well spent during professional learning (68%). Many of the teacher's responses reveal a divide in perception of quality, shown by approximately half of teachers indicating that they are dissatisfied with the professional learning in their district (53%). Additionally, a narrow majority of teachers agree that they receive appropriate guidance and facilitation for effective professional learning (55%). Conversely, a small margin of teachers disagreed that their needs are met by the professional learning within their school/district (57%) and felt that they are not provided with sufficient time to engage in professional learning initiatives within their school (55%).

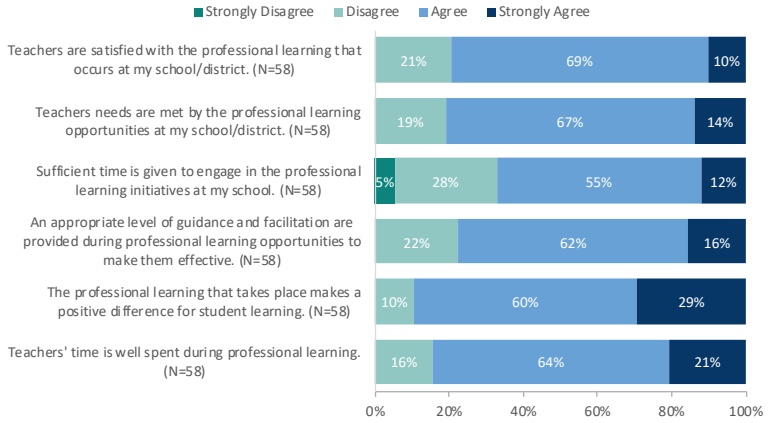
Figure 6. Teachers' Perceptions of Quality of Professional Learning



Administrators viewed the quality of professional learning consistently higher than teachers, displayed in Figure 7. Administrators

aligned with teachers by agreeing or strongly agreeing that professional learning makes a positive difference for student learning (89%), teacher's time is well spent during professional learning (85%), and teachers receive appropriate guidance and facilitation for effective learning (78%). In contradiction with teachers, most administrators agreed or strongly agreed that teachers' needs are met by the professional learning opportunities available in their district (81%), teachers are satisfied with the professional learning opportunities available (79%), and teachers are provided sufficient time to engage in professional learning at their school (67%).

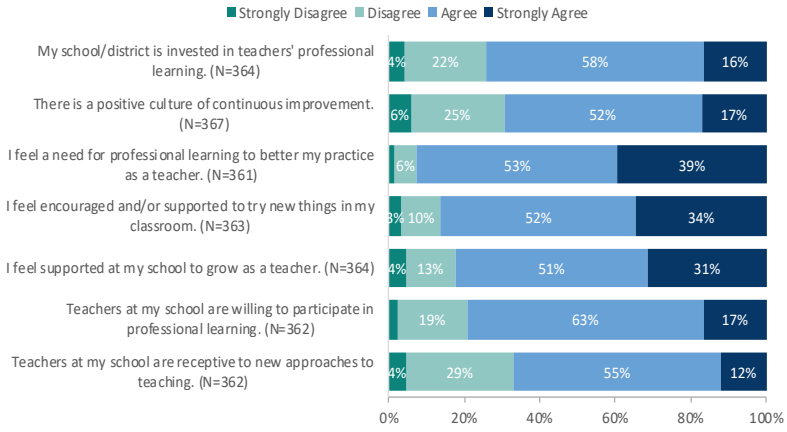
Figure 7. Administrators' Perceptions of Quality of Professional Learning



School Culture Surrounding Professional Learning

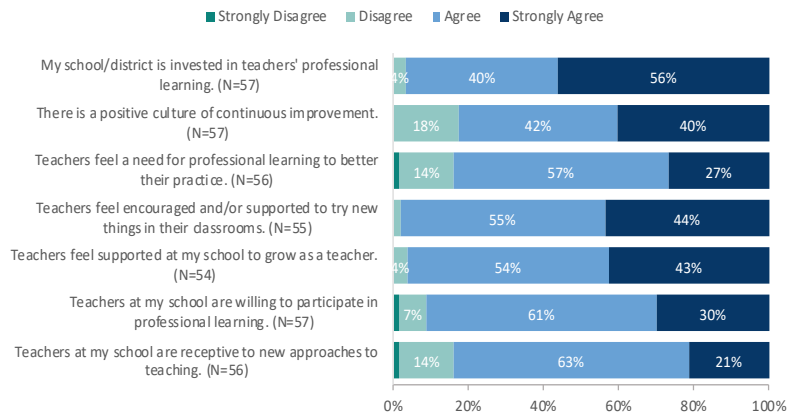
Teachers and administrators were asked about the extent to which they agreed or disagreed with statements concerning their school's culture surrounding professional learning, and nearly all teachers agreed or strongly agreed with each statement. Shown in Figure 8, teachers strongly agreed or agreed that they feel a need for professional learning to grow their teaching practice (92%), they feel encouraged and/or supported to try new things in their classroom (86%), they feel supported at their school to grow as a teacher (82%), teachers at their school are willing to participate in professional learning (80%), they feel their districted is invested in teachers' professional learning (74%), they sense a positive culture of continuous improvement within their school/district (69%), and teachers at their school are receptive to new teaching approaches (67%).

Figure 8. Teachers' Perceptions of Culture Surrounding Professional Learning



According to Figure 9, administrators generally evaluated the culture surrounding professional learning in their districts higher than teachers, with a large majority marking strongly agree or agree for each statement. In parallel with teachers, administrators agreed or strongly agreed that teachers feel encouraged and supported to try new things in their classrooms (99%), teachers feel supported to grow in their practice (97%), their school/district is invested in teacher's professional learning (96%), teachers within their school are willing to participate in professional learning (91%), teachers at their school are receptive to new approaches in teaching (84%), and there is a positive culture for continuous improvement (82%). The only statement that administrators strongly agreed or agreed with less than teachers is that teachers feel a need for professional learning to better their practice (84%), exhibiting that administrators do not perceive teachers' desire for professional learning as highly as teachers do.

Figure 9. Administrators' Perceptions of Culture Surrounding Professional Learning



Most Impactful forms of Professional Learning

Table 3. Themes from Impactful Learning Responses

Role	#	%
Teachers		
Hands-on, Implementation Focus	53	20%
Curriculum-Specific Programming	50	19%
Relevance to Classroom Contexts	48	18%
Collaboration with Peers, PLCs	48	18%
Out-of-District Opportunities	39	15%
Technology-Oriented Learning	32	12%
Conferences and Guest Speakers	24	9%
Sustained, Embedded, Ongoing Support	17	7%
Unsure	17	7%
Teacher Input & Choice	16	6%
Subject-Area-Specific Programming	15	6%
Emphasis on SEL, Trauma	12	5%
Administrators		
Collaboration with Peers, PLCs	10	23%
Teacher Input & Choice	10	23%
Sustained, Embedded, Ongoing Support	7	16%
Technology-Oriented Learning	7	16%
Hands-on, Implementation Focused	6	14%
Curriculum-Specific Programming	6	14%
Emphasis on SEL, Trauma	5	12%
School Redesign and Improvement	3	7%
Training on Curriculum Materials	3	7%
Focus on Data Use	3	7%

Teachers were asked to reflect on the qualities of professional learning that they have received through their schools or districts that were most impactful. Note that in this open-ended response, many respondents also expressed forms of professional learning that they would find impactful, although they have not necessarily received those types of opportunities. Common themes from respondents (n=260) answers, from both teachers and administrators, are captured below, and overall response themes are summarized in Table 3.

Teachers in particular seemed appreciative of professional learning opportunities that provided hands-on learning opportunities focused the meaningful implementation of specific, relevant curricula and pedagogies. Given the constraints (geographic, financial) of rural districts, respondents also indicated that impactful professional learning took into consideration travel time to conferences and centers.

- (T) "It gives us a window to learn/discuss a topic that would benefit our students and decide how to best implement it."
- (A) "This allows planning to turn to action."

Collaboration with Peers, PLCs

- (T) "It is how students want to learn and makes me step out of my comfort zone."
- (A) "We have focused on technology to meet the needs of both remote and face to face students."

Technology-Oriented Learning

- (T) "We learn something, have time to try it out, ... ask for feedback, ... reflect, ... then implement."
- (A) "Ongoing series of PD with embedded coaching support."

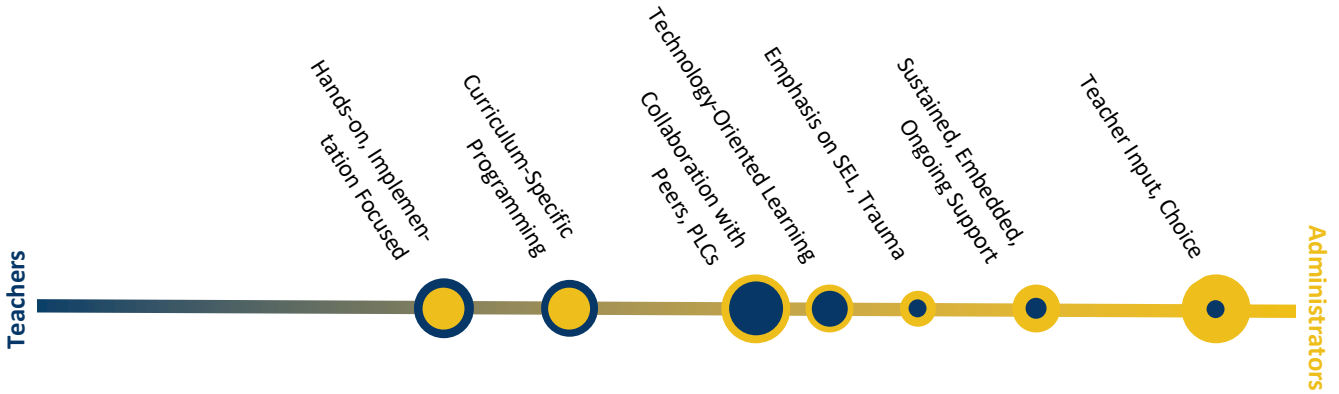
Sustained, Embedded, Ongoing Support

Curricula Cited as Impactful Professional Learning

Leader in Me
Kagan
Lead4ward
One more

Administrators, on the other hand, were most grateful for professional learning that was driven by input from practitioners. Few administrators also noted learning opportunities that focused on larger-scale trainings such as school redesign and improvement. Both groups indicated that collaboration with peers – whether through a PLC or otherwise – was beneficial, as well as the collaboration being sustained and embedded.

Figure 10. Overlap in Teacher and Administrator Themes for Impactful PL
(size of circle indicates magnitude of response category)



Challenges to Implementing Professional Learning

In response to identifying challenges their schools and districts faced in implementing professional learning, teachers and administrators were both asked what supports or resources their schools and districts would need to overcome them.

In these open-ended responses, teachers (N=228) identified the need for scheduled time for professional learning, financial resources, access to professional learning opportunities, and teacher input for personalization of professional development. In these responses, many teachers expressed doubt surrounding the capacity for these supports to be implemented due to the constraints of rural districts.

Administrators (N=35) recognized similar support needs to teachers, including the need for flexible scheduling of professional learning, financial resources, creating a shared vision with teachers leading to a culture change, and improving the quality of PD topics and presenters. They frequently expressed doubt about the ability to implement changes due to state regulation.

Table 4. Themes from Challenge to PL Implementation

Role	#	%
Teachers		
Scheduled Time for PD & Coverage	65	29%
Financial Resources	51	22%
Access to Professional Development	28	12%
Teacher Input for Personalization of PD	25	11%
Collaboration Opportunities	22	10%
Increased Relevance & Quality of PD	22	10%
Implementation Support & Coaching	21	9%
Shared Vision/ Change Culture	21	9%
Effective Administration	13	6%
Connections to Overcome Isolation	12	5%
Higher Quality PD Trainers/Staff	7	3%
Administrators		
Flexible Scheduling of PD	15	43%
Financial Resources	12	34%
More Time for PD & Implementation Support	7	20%
Increased Buy-in from Teachers/Culture Change	5	14%
Improving the Quality of PD Topics & Presenters	4	11%
Increased Communication & Collaboration	1	3%

Financial resources scored highly with both teachers (22%) and administrators (34%), as it is an area outside of a district's control. The open-ended responses surrounding this issue reveal the myriad of impacts rural districts experience through being under-funded. Without proper funds, a school cannot afford substitutes, and cannot afford to bring in high-quality PD professionals or hold professional development sessions by subject area. This reality means that teachers who are not in low-performing subject areas cannot receive PD, or they receive PD that is irrelevant to their day-to-day work. Elective teachers are often grouped in with teachers of other subjects as well, leading to irrelevant PD. Additionally, districts cannot afford to compensate teachers for planning time after PD, send teachers to conferences, or afford access to necessary technology. These factors lead to the continuation of rural districts, and their teachers, being isolated from education best practices and colleagues in their field. Before other supports can be provided, the financial need of rural districts must be addressed.

- (T) "In order to meet together, we would need substitutes; this is something that we never have enough of."
- (A) "Many schools with students whose are in a low SES area can not, nor should not, have late start or early release unless they can still bring in the children with paraprofessionals or other adults while the staff is training"

Rational Scheduling & Coverage for Training Days

- (T) "Money controls a lot of the quality of training received."
- (T) "We rarely have the funds to bring someone in to work with teachers. If we do get someone in, it is [only] for subjects that are performing below expectations."
- (A) "Most challenges boil down to time and money"

Financial Resources

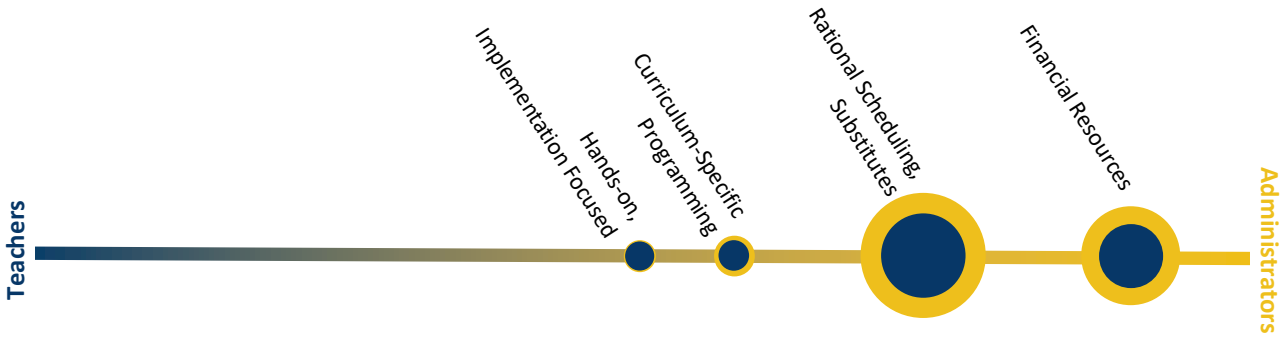
- (T) "We are at different levels of learning. We give choice to students; we should model it."
- (T) "There is also many times where we join professional learning that does not apply to us, so we get discouraged and feel that our time could be better spent."
- (A) "I'd like to see teachers identify needs and professional development opportunities that they would like."

Teacher Input for Personalization

Supports Needed to Overcome Implementation Challenges

In response to identifying challenges their schools and districts faced in implementing professional learning, teachers and administrators were asked what supports or resources their schools and districts would need to overcome those challenges. Teachers (N=228) identified the need for dedicated and scheduled time for professional learning (29%), financial resources (22%), more access to and availability of professional learning opportunities (12%), and increased personalization and teacher input (11%).

Figure 11. Overlap in Teacher and Administrator Themes for PL Implementation Challenges
(size of circle indicates magnitude of response category)



Recommendations and Next Steps

Much of what was discovered in our query of rural educators supports what is already known about the nature of rural professional learning experiences. Over half of the educators in our study reported that key components required for job-embedded professional learning were not in place in their districts. Professional learning experiences are primarily one-time events or seminars that occur outside the school day. There is a lack of experienced, qualified instructional coaches.

While teachers report and research supports that collaborating with and observing other teacher are valuable professional learning experiences (Zhang, Parker, Koehler, & Eberhardt, 2015), the professional isolation of rural educators is well documented in the literature (NASBE, 2016) and supported by our data.

Teachers expressed the desire to have professional learning that is relevant and personalized. They value learning that is hands-on and focuses on implementation of specific cur-

ricula and pedagogies. Yet small, isolated schools are challenged to find the expertise and resources required. Staff are traveling long distances to seek out these types of professional learning experiences. Bringing outside expertise into schools and relying on external experiences impedes the ability of educators to participate in ongoing job-embedded professional learning.

Time and lack of flexible scheduling are identified as the primary impediments to successful professional learning experiences. There is a need for creative approaches to scheduling, calendars, and use of personnel to create the situation where professional learning is an integral part of every educator's work day. Lack of financial resources in rural areas is a severe impediment to implementing creative solutions and allowing schools access to high-quality professional learning experiences.

While the challenges to job-embedded professional learning for rural educators presented in this study are well documented in educational research, there is a pressing need to determine how to best support teacher growth and efficacy in rural schools. Research funding to investigate questions around professional growth of rural teachers has the potential to grow the knowledge base around questions such as:

- How might virtual, blended and face-to-face environments be maximized to fill in the equity gaps in experienced by rural educators?
- How might integrating new technologies such as online learning platforms, community and social media tools, virtual reality and simulations enhance these learning environments?
- How might rural schools nationwide consistently build networks and consortia that share materials and resources?
- What are the best practices for the use of experienced regional coaches to support job-embedded professional development across multiple schools?
- What constitutes an effective professional learning community and community of practice that has the potential to reduce rural isolation?
- How can a local education service center, and/or institution of higher education build and scaffold the many aspects of online learning communities in partnership with area rural schools?

Rural schools are at the heart of rural communities and are their hope for a place in this modern economy. However, challenges facing rural schools provide significant obstacles in creating environments that prepare students for a changing future. Rural students have their "own stories, struggles, and dreams. They should matter to our country." (Showalter, Johnson, Klein, & Hartman, 2017). We have a responsibility to the over 12 million rural students in this country to provide quality opportunities for improving the educational experiences provided by rural teachers.

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