THE
PAST FOUNDATION

Rural Collaborative to Improve Instruction and Expand Student STEM Opportunities and 21st Century Skills through Literacy Design Collaborative (LDC)

Section I: Evaluation

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PART 1

July 31, 2017

THE PAST FOUNDATION

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2016-2017 YEAR END REPORT

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Rural Collaborative to Improve Instruction and Expand Student STEM Opportunities and 21st Century Skills through Literacy Design Collaborative (LDC)

SECTION I: EVALUATION REPORT, July 31, 2017

The Rural Collaborative to Improve Instruction and Expand Student STEM Opportunities and 21st Century Skills through Literacy Design Collaborative (Rural LDC Project) is a project funded by the Ohio Department of Education, Straight A Fund. The project is designed for implementation in five rural districts that comprise the Rural Collaborative consortia schools, including Northwestern Local Schools, Mapleton Local Schools, Hillsdale Local School District, Loudonville-Perrysville Exempted Village Schools, and Black River Local Schools. The project duration involves the grant year (2016-17), and five sustaining years (2017-18 through 2021-22). The project is being implemented during the grant year by the Northwestern Local Schools in partnership with Battelle Education (BEd) and High Schools that Work (HSTW).

The PAST Foundation Knowledge Capture Program (KC) is evaluating project implementation and project outcomes. This report presents evaluation conducted during the grant year (2016-17) and includes individual implementation activity reports by the lead project organizations and are presented in Sections II to IV to this evaluation report, including Northwestern Local Schools (*Section II*), Battelle Education (*Section III*), and High Schools that Work (*Section IV*).

Mid-Year Report (August – December 2016)

The Mid-Year report submitted March 8, 2017 provided an overview of project implementation conducted during fall 2016 (August – December 2016) of the grant year of the project. Supporting documentation for this time period was also submitted as part of the supporting documentation for the report presented in the Appendix of the Mid-Year Report. For reference, the *Mid-Year Report Appendix Cover Page* is presented in this report (see *Appendix A: Mid-Year Appendix Cover Page*). Those documents are considered to comprise Part A of the grant year report; however, the files are not resubmitted with this document and are incorporated by reference and list presented in *Appendix A*.

This document will focus on implementation activities conducted during January 2016 through July 2017. These activities include continuing PD and support for Cohort 1 (C1) teachers (n=15) and Cohort 2 (C2) teachers (n=10). Primary activities achieved during this time period involved nine main components of implementation:

- Monthly Implementation Team Review with District Liaisons
- Mid-project District Leadership Planning Session
- Cohort 1 Teacher Professional Development
- Cohort 1 Post-Project Implementation Teacher Survey
- Cohort 1 Classroom coaching and observation
- Cohort 1 Submittal and review of LDC Module 2
- Cohort 1 Submittal and review of Module 2 sample student projects
- Cohort 2 Teacher Professional Development, phase 1
- Cohort 2 Teacher Pre-Implementation Survey, phase 1

Project formative evaluation activities are presented in *Appendix B: PAST Foundation Project Evaluation Schedule 2016-17. Table B1: Rural LDC Project Year 1 Evaluation Schedule* shows evaluation activities in coordination with the major implementation tasks scheduled and conducted by the Project Partners. This includes revisions for the Spring 2017 schedule developed by the Implementation Team to meet project goals and to better accommodate individual district needs and preferences to initiate training for C2 teachers, as well as to extend the original schedule for C1 deadlines to provide more time for completing Module 2.

Evaluation activities were conducted onsite, or virtually via Zoom®, an interactive web-based platform that supports real-time, virtual participation. *Appendix C - Table C1: Rural LDC Chronology of PAST Foundation Project Evaluation Activities, 2016-17,* provides a more detailed description of work led by the KC Evaluation Team in collaboration with the Project Partners including Northwestern Local Schools Project Manager, BEd, and HSTW. This aspect of formative evaluation involves a process for integrating data collection, review, and feedback to inform implementation strategies established during fall 2016, and continued in the same manner during spring 2017 to accommodate revisions to the timeline made by the Implementation Team. In addition to quarterly evaluation meetings, the *KC Chronology* provides details on additional evaluation meetings organized and conducted as needed in support of key activities

that occurred during phases of implementation. In this approach the KC Evaluation Team continued to provide real-time data to inform project implementation strategies developed by the Implementation Team and is presented in *Table 1*.

Table 1: LDC Rural Collaborative
Knowledge Capture Summary of Formative Evaluation Activities (August 2016 – July 2017)

Evaluation Task	Process Conducted by Evaluation Team	Evaluation Product
Observation of LDC Rural Collaborative Implementation Activities	Structured observation of: 1) monthly Implementation Team meetings (**n=11**) to reflect the process of stakeholders, including communication and input from the District Liaisons related to diverse district priorities during phases of project activities; 2) LDC professional development sessions for C1 and C2 teachers (**9/29-30, 10/14, 12/9, 3/24, 5/10, 5/17**); and, 3) Informational meetings and updates for district administrators and staff related to project planning and coordination to support district priorities (**9/7, 12/9,1/30**).	Bullet point reports providing summary of observation data to provide systematic review of Implementation Team structure and process, and to support C1 and C2 Teacher Professional Development
One-on-One Interviews	Conducted key informant interviews (n=8) during fall 2016 with the BEd LDC Coaching Team and the HSTW Coaches to inform formative evaluation of coaching priorities, goals for training, ongoing classroom support, and overall implementation strategies; additional analysis of interview data also informed pre/post teacher survey design.	Narrative analysis of training goals and expectations of LDC Coaches; identify diverse perspectives and experiences that contribute to building targeted coaching support for Cohort 1 aligned to project goals.
Teacher Surveys	Grant Year: Design and conduct pre/post online surveys for (15) Cohort 1 teachers in 5 consortia schools. Survey data included classroom instructional practices including teacher perceptions of program impacts related to science and literacy LDC instructional strategies, and views on a range of practices to achieve student engagement in science learning. Following review and input, the C2 pre-implementation survey was revised and administered in phase 1 of C2 PD and conducted on 5/17/17.	Qualitative and quantitative survey analysis presented in a concise report for review by the Evaluation Team; review and input was also conducted with the implementation Team .
Data Collection of Project Materials	The KC Team created a Google shared drive for Project Partners to archive supporting materials provided to C1 Teachers, and support access to information provided in PowerPoint decks, handouts, and other materials created for C1 and C2 teachers and district staff.	Systematic data collection of supporting documentation for project planning and review; archiving materials for project grant reports.
Formative Evaluation Meetings	Quarterly meetings to coordinate modification of project partner implementation schedules; review logistics of evaluation team involvement in project implementation activities; review interim stages of analysis with Project Partners based on preliminary summary of qualitative and quantitative data to inform implementation strategies; quarterly review of formative data collection and activities; conduct additional Evaluation Team meetings as needed to support key implementation activities.	KC Team conducted **(20) 1–2 hr.** quarterly, PD debrief, and ad hoc meetings coordinated to support implementation planning; summary meeting notes provided to the Project Partners.

The Evaluation Team held (20) meetings including (4) quarterly Evaluation Team meetings (10/28/16, 1/23/17, 3/15/17, and 5/22/17), as well as work-in-progress meetings including survey review, PD planning and review, and team debrief sessions following Implementation Team meetings and professional development sessions. Quarterly Evaluation Team Meeting agendas are presented in *Appendix D*.

The following sections focus on activities conducted by the Project Partners to support C1 Teacher LDC module design, completion, and review of the LDC Science and Literacy Module 2, as well as review of examples of student projects completed during spring 2017. (Please refer to the Mid-Year Report for details on Module 1 implementation activities completed during fall 2016.)

Summary of Project Implementation Activities, January to July 2017

The project LDC Implementation Team (LDC-IT) members participated in monthly review of project activities. The monthly meetings were intended to support District Liaisons to provide important and timely feedback from each district to Project Partners, coordinate particular actions across districts, and assess any additional support needed by Project Partners to better meet the needs of individual district participants. This process has been guided by the Communication Plan (submitted 10/31/16) providing a planned schedule for date and location of regular monthly meetings for District Liaisons to meet with the Project Partners and for the group referred to as the LDC Implementation Team (LDC-IT). The main modification to the Implementation Team process was to reschedule monthly LDC-IT meetings to occur immediately after the end of the school day requested by District Liaisons to reduce time away from classroom and instruction.

The District Liaison participants remained the same during spring 2017 allowing for continuity between fall 2016 and spring 2017 support for C1 teachers in working with the five districts. A list of the LDC-Implementation Team members is presented in *Section II*. Additionally, the LDC Project Manager held individual one-on-one meetings with district leaders during fall 2016. The Project Manager also coordinated a Planning Session for District level staff on January 30.

District administrators participated in a project launch on September 7, 2016. This afternoon event was designed to introduce project goals and objectives to district staff, Board of Education members, and C1 Teachers. The LDC-IT team also planned two additional meetings to provide opportunities for the project team to engage district leadership of each of the five districts. District leaders were invited to an early morning session held on 12/9/16 to coincide with the final PD session for Module 1 review, allowing district leaders to view samples of student LDC project work, and poster presentations provided by HSTW (see *Mid-Year Report 3/6/17)*. The LDC Project Posters were designed to show work-in-progress based on photos of classroom work and other documentation produced by HSTW during fall 2016 using information gathered during on-site visits. Project Partners were invited to provide LDC project information for the December 9 event to share information with district leaders and invited press to support outreach to community members. These materials and local newspaper accounts of the event were also submitted with the *Mid-Year Report.*

A second session for district leadership was developed during the fall implementation planning process, and was conducted January 30, 2017 to foster discussion and gain district input on planning for spring 2017 implementation activities, and review of the plan for C2 training. In particular, certain districts reported that plans to modify the Implementation Plan for C2 teacher-training dates were already in discussion as of November 2016, reflecting different district priorities and needs for coordinating activities of LDC district trainers for 2017-18. The revisions made for C2 launch of training in May 2017 (revised from August 2017) recognized distinctions across districts in best timing for Cohort 2 PD to begin, and also to consider preferences for C2 teachers to begin training prior to summer, giving teachers the option to potentially integrate LDC in their planning and preparation for the fall 2017 school term.

A third project event, "*End of Year Reconnect*," was held for district leadership and the broader community on May 3, 2017. Conducted by HSTW, six teachers from three districts presented their science modules to the community (see *Section IV*).

Professional development activities conducted during spring 2017 is reported in detail in the Battelle Education Project Report (see *Section III*). The High Schools that Work year-end report is also presented with supporting documents in *Section IV.*

Evaluation of Implementation Year Outcomes (2016-17)

The data collection research design is presented in *Table 2: Rural LDC Evaluation Research Plan*. This section of the report provides data analysis in response to research questions presented in *Table 2* including four research questions focused on teacher LDC skill development (EP-1 to EP-4), and one question on student performance (EP-5).

TABLE 2: Rural LDC Evaluation Research Plan (revised 4/28/17)

Research Question	Data Collection	Methodology/Instruments
EP-1: Does LDC PD support improvements in teachers' ability to assess student work (LDC rubric) to provide feedback and differentiate instruction to improve student learning?	Teacher rubric to assess quality of instructional design; reflection of instruction, modification and evidence of changes in instruction; use of LDC student rubric	Observation of PD workshops; LDC coach rubric assessment of LDC modules; HSTW onsite coaching reports to capture reflection and modification
EP-2: Does LDC PD support increased collaboration among Rural Collaborative teachers (within districts and between districts) to share best practices in implementing LDC modules and use of student rubrics?	Reflection on instruction, modification and evidence of changes in instruction; numbers of teachers reporting use of the same module and/or sharing of resources; one-on-one interviews with LDC coaches; numbers of modules submitted for national review	Observation, and quantitative evidence of numbers of modules produced and repurposing or reuse of those LDC modules
EP-3: What are barriers or challenges that could impede LDC implementation?	Survey Data; focus group data; one-on-one interview data with LDC coaches	Online Pre/Post Survey; onsite focus group structured dialogue; virtual recorded interviews
EP-4: What strategies are teachers employing to overcome these challenges in attaining best practices?	Survey Data; focus group data; one-on-one interview data with LDC coaches	Online Pre/Post Survey; onsite focus group structured dialogue; virtual recorded interviews
EP-5: What evidence in student performance shows improvement from increased exposure to science concepts and development of STEM skills through hands-on problem based learning and design cycle thinking?	Student test data showing changes over time to track progress in basic to proficient, and proficient to advanced competency	Quantitative student assessments, comparative data 2017 through 2022

LDC Instructional Skill Development and Classroom Implementation

First year data shows progress with particular goals for C1 teachers, with some aspects of LDC skills showing a positive shift toward meeting implementation goals. Survey data and observation data also show other areas that were identified by C1 teachers as challenges. The LDC Implementation Team, BEd, and HSTW focused on areas of particular support to help strengthen LDC skills gained during Year 1 of classroom implementation (2016-17), and also helped to modify the training initiated for C2 teachers (planned classroom implementation 2017-18), as well as during sustaining

years of the project. Survey data, PD and workshop observation, as well as observation/on-site coaching reports form the basis of this evaluation. Pre- and post-implementation survey reports are presented in *Appendix E* of this document. This includes *Rural LDC Teacher Pre-Implementation Survey Report Combined Survey Responses for September 30, 2016 and October 14, 2016*, and *Rural LDC Cohort 1 Post-Implementation Survey*. Additionally, revisions to the post-implementation survey design are presented in *Appendix E* in a working document (*Table E1: Pre/Post Survey Review and Modifications)* showing comparative pre/post questions and revisions made with review by the LDC-IT. *Appendix F* of this document presents pre/post infographic summary reports including *LDC Pre-Implementation Infographic Summary of Survey Data, Cohort 1*, and *LDC Post Implementation Infographic Summary of Survey Data, Cohort 1*. The infographic reports were produced by the Knowledge Capture Team and issued as stand-alone reports to help support communication to the Rural Collaborative district-level staff on progress and comparative views of changes in teacher practices, as well as self-reported challenges, and confidence level of C1 teachers regarding classroom implementation and work with students.

The discussion that follows provides a view of evaluation research questions and evaluation of implementation year outcomes including pre-implementation baseline data reflecting teacher self-reporting on science instruction prior to LDC training, and two post-training surveys conducted in mid-October 2016 and March 2017. *Section III* of this Year End Report on Professional Development design, implementation, review and modification, and *Section IV* reporting coaching and onsite support for C1 teachers also inform evaluation of progress with LDC skill development and classroom implementation.

Research Question EP-1:

Does LDC PD support improvements in teachers' ability to assess student work and provide feedback and differentiate instruction to improve student learning?

Assessment of Student Work

Two training sessions on student work product evaluation were conducted by the BEd LDC Team to review evaluation of student work products using the LDC student rubric. The first session held on December 9, 2017, attended by (13) C1 teachers, was focused on use of the LDC student rubric to evaluate student work products in grade level bands based on student work from Module 1. The December 9 work session was primarily organized for C1 teachers to work in groups to review and score student work by grade band. During the group scoring process of a sub-set of student work

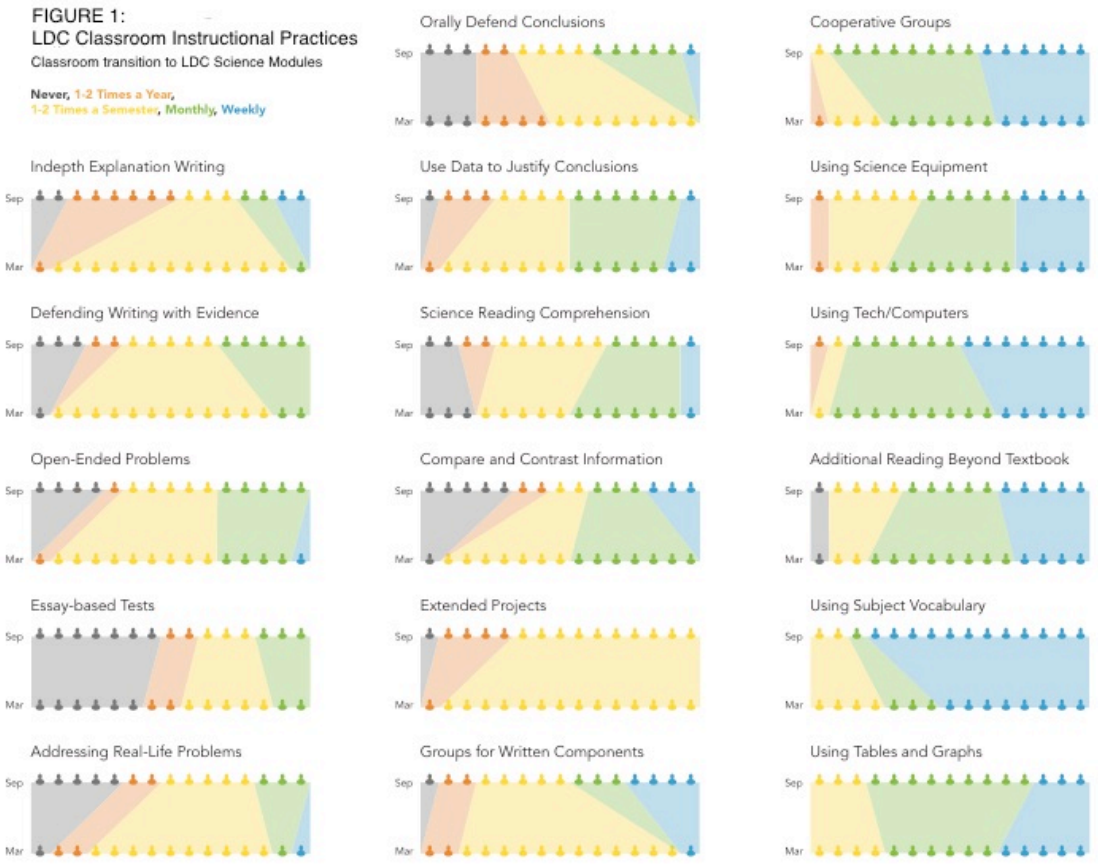
products, it was apparent that teachers were not able to calibrate scoring for consistent evaluation and after two rounds of working in groups using the student rubric, it was apparent that teachers were unable to effectively use the rubric.

Based on the team's assessment of the issues identified in December, the second training session to review student work products from Module 2 was held on March 24, 2017 and was organized for teachers to work as a whole group, not by grade band. This allowed teachers to experience evaluation of their own students' work products by the entire group to identify areas where students had not met expectations, and to then redesign/modify their own module teaching tasks to improve student performance based on the individual student rubric analysis. The final session of the day allowed teachers to actually redesign module teaching tasks with assistance from the LDC coaches based on areas identified in the scoring process where students had not met expectations. *Section III* of this report discusses the approach and work undertaken to support increased skill development for C1 teachers to improve their ability to assess student performance, and modify the instructional design to address specific areas of need to improve student growth.

Changes in Instructional Practices

Based on pre/post survey data, shifts in classroom instructional practices reported by teachers show trends that reflect initial stages of a shift from traditional classroom instruction based on textbook and lecture, weekly lesson cycles, and frequent testing (pre-implementation survey data of 9/30/17), and transition to LDC Design Cycle and Problem Based Learning organized and paced for extended instruction of 2 weeks to 8 weeks of instruction using the LDC module. *Figure 1: LDC Classroom Instructional Practices*, shows pre-implementation in comparison to post-implementation instructional methods in a series of (17) questions (adapted from HSTW survey questions regarding science instruction). In Figure 2, the shift from "never" (grey) or "1-2 times/year" (orange) to "1-2 times/semester" (yellow) shows the shift to extended projects and associated problem oriented approach to learning, allowing students to explore the focus of research and project activities over a period of 2-8 weeks, moving away from a 5-day cycle of textbook chapter and end-of-chapter weekly quiz or exam.

FIGURE 1: LDC CLASSROOM INSTRUCTIONAL PRACTICES



Teachers self-reported using the following instructional methods in September "never" or "1-2 times a year" (referring to prior practices used in the 2015-16 academic year and earlier). The following list shows areas where teachers showed a shift to practices 1-2 times/semester (yellow band), in comparison with increases reported in the March 2017 responses:

- *Indepth Explanation Writing*:
  - (8) reported *never* or *1-2 times/year* in September; in comparison pre-data show (3) teachers increased to (13) teachers assigning indepth writing *1-2 times/semester* in March.
- *Defending Writing with Evidence*:
  - (5) teachers reported *never* or *1-2 times/year* in September; in comparison (5) teachers reported *1-2 times/semester,* with an overall increase to (12) in March.
- *Open*-Ended Problems:
  - (5) teachers reported *never* or *1-2 times/year* in September; in comparison (5 teachers reported *1-2 times/semester* in September, with an overall increase to (9) teachers in March.
- *Addressing Real-Life Problems*
  - (7) teachers reported *never or 1-2 times/year* in September; in comparison (5) teachers reported *1-2 times/semester* in September, with an overall increase to (10) in March.
- *Use of Data to Justify Conclusions*
  - (4) teachers reported *never or 1-2 times/year* in September; in comparison (4) teachers reported *1-2 times/semester* in September, with an overall increase to (7) teachers in March.
- *Extended Projects*
  - (5) teachers reported *never or 1-2 times/year* in September; in comparison (10) teachers reported *1-2 times/semester* in September, with an overall increase to (14) teachers in March.
- Group Work in Written Components
  - (3) teachers reported *never or 1-2 times/year* in September; in comparison (5) teachers reported *1-2 times/semester* in September, with an overall increase to (12) teachers in March.

Two additional areas, "Science Reading Comprehension," and "Compare and Contrast," assignments shifted as follows:

- *Science Reading comprehension*
  - (4) teachers reported assigning students writing using evidence they read to support their conclusions *monthly* in September; in comparison (6) teachers increased this *monthly* in March.

- *Compare and Contrast*
  - 4) teachers reported requiring students to compare and contrast from one text to another *monthly* in September; in comparison (7) teachers reported increasing to *monthly* in March.

This survey data shows very early shifts occurring among the first cohort of teachers. While these trends are not yet paced to more robust increases, the transition over the sustaining five years should continue to show practices moving to correspond with problem based learning and design thinking. These practices will also be impacted by initiating PD in problem based learning during the 2017-18 school year, led by Northwestern Local Schools. Considering that two of the Rural Collaborative districts have not exposed their teachers to PBL, the impact of the next phase of PD will provide teachers with increased skills to gain experience with implementing PBL in the classroom.

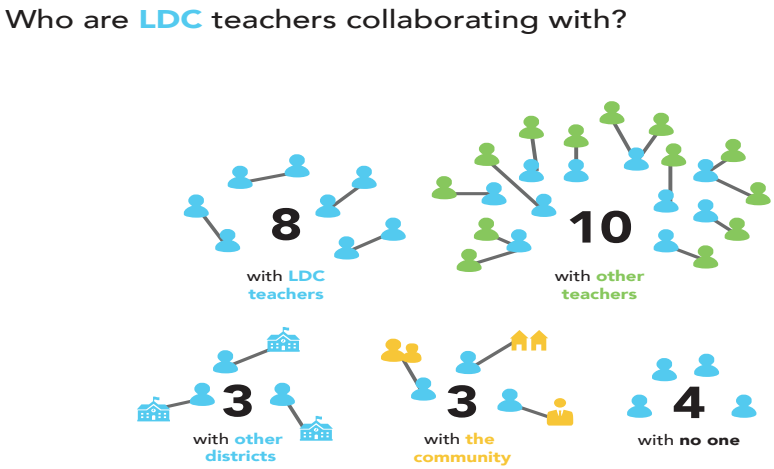
Research Question EP-2:
Does LDC PD support increased collaboration among Rural Collaborative teachers (within districts and between districts) to share best practices in implementing LDC modules and use of student rubrics?

This question addresses two aspects of LDC implementation: 1) increased collaboration during implementation of LDC among science teachers; and 2) sharing of best practices as teachers explored new skills in conducting LDC instruction in their classroom. In reviewing survey data on teacher views on collaboration together with observation data (HSTW fall 2016), teachers found collaboration with other C1 teachers to be a valuable aspect of their ability to implement their LDC modules beginning in the fall with Module 1, and continuing in the spring with Module 2.

Pre- and post implementation survey data showed that 14 of the 15 teachers (over 90%) indicated that collaboration and sharing best practices with other teachers was *Very Important* or *Somewhat Important*. Based on HSTW coaching reports (onsite classroom coaching), *Figure 2: Fall 2016 Teacher Self-Reported Collaboration Associated with LDC Classroom Implementation* shows that during October to December, only 4 of the 15 teachers reported that they *did not* collaborate with other teachers during implementation of Module 1. Of the (11) teachers that did report collaboration during LDC implementation, ten stated that they were collaborating with teachers who were not participating in LDC training (non-cohort teachers), and three teachers reported that

they had reached out to LDC teachers in the other LDC districts. This activity is a goal of both the Rural LDC project, as well as a more general goal of the Rural Collaborative consortia schools.

FIGURE 2: Fall 2016 Teacher Self-reported Collaboration Associated with LDC Classroom Implementation (HSTW Coaching Reports, Fall 2016)



HSTW coaching reports documenting classroom implementation during spring 2017 (January through March), continued to track communication between science teachers in the five Rural LDC districts. However, revisions made to the HSTW coaching template resulted in use of two different versions of the coaching report. During spring 2017 all (15) C1 teachers had onsite classroom HSTW coaching twice during the semester, generating 30 coaching reports. Of those coaching reports that documented communication it was noted that teachers reported "Cross-Communications with Science Teachers within the Building/District (8 reports); Cross-Communications with All Curriculum Teachers (2 reports); and, "Cross-Communications with Teachers outside their district" (2 reports).

Additionally, of the (8) teacher coaching reports that documented aspects of communication, all teachers indicated communication with other science teachers. Eight teachers also reported communication with other non-cohort as well as Cohort 1 science teachers in their building/district; and, (2) teachers also reported communication with non-science teachers in their building/district. Four coaching

reports indicated that teachers communicated with teachers outside their district, three with other LDC teachers, and one reported reaching out to a non-cohort teacher in another district.

This trend will continue to be tracked as the C2 teachers initiate training and classroom implementation to understand in particular how C1 teachers and C2 teachers are benefitting from sharing of best practices during 2017-18. The recommendation to HSTW is to revise the coaching report template to consistently document collaboration, and that both the HSTW onsite coaching sessions and the LDC C2 PD sessions are designed to encourage teachers to reach out across cohorts, and between districts.

Research Question EP-3:
What are barriers or challenges that could impede LDC implementation?

Survey data regarding teacher identified challenges is presented in *Table 3* and *Table 4*. The survey question provided teachers the opportunity to respond in an "open ended" format, identifying any aspect of their experience during 2016-17. Data is organized thematically to show areas perceived by C1 teachers to present potential challenges for Module 1 (M1) and Module 2 (M2) implementation by grade band.

TABLE 3
Teacher Identified Challenges
(LDC M1 – Fall 2016)

Challenges	Teacher Grade Level	
	Grades 5-8 (n=5)	Grades 9-12 (n=8)
Time management	✔	✔
Managing content	✔	✔
Understanding how to implement LDC	✔	✔
Managing student expectations	✔	
Teaching writing skills	✔	
Collaborating with other teachers	✔	
Student accountability		✔
Access to resources		✔
Keeping students on task		✔
Using CoreTools		✔

TABLE 4
Teacher Identified Challenges
(LDC M2 – Spring 2017)

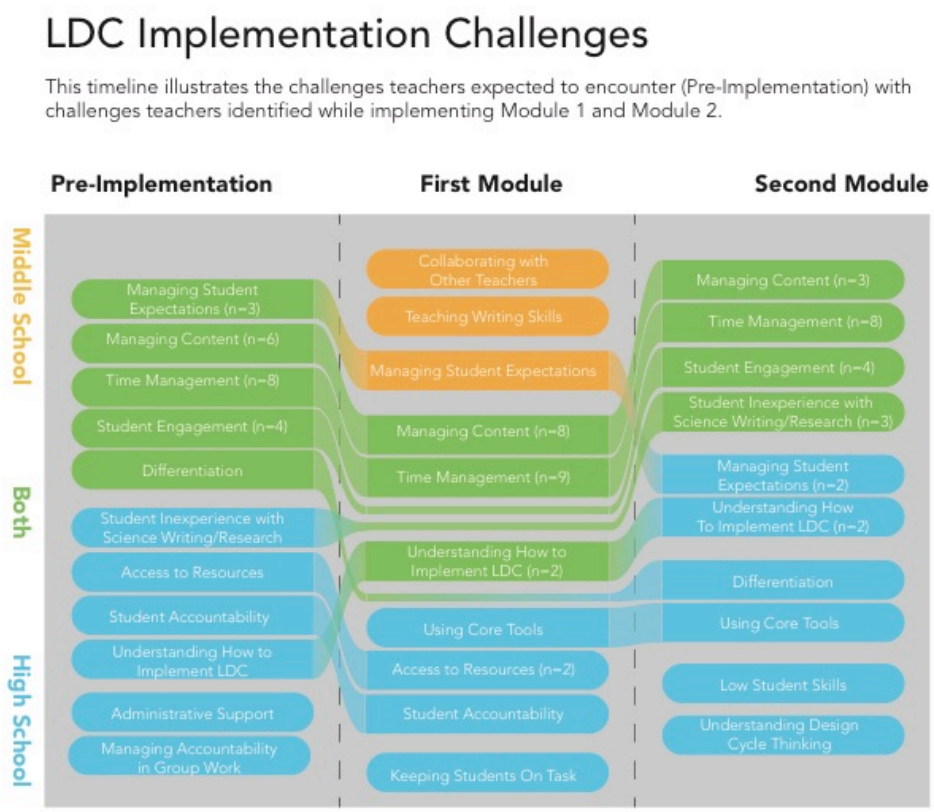
Challenges	Teacher Grade Level	
	Grades 5-8 (n=5)	Grades 9-12 (n=9)
Time management	✔	✔
Managing content	✔	✔
Student inexperience with science writing/research	✔	✔
Student engagement	✔	✔
Managing student expectations		✔
Differentiation		✔
Understanding how to implement LDC		✔
Low student skills		✔
Using Core Tools		✔
Understanding Design Cycle thinking		✔

A comparative view of these issues is presented in *Figure 3: LDC Implementation Challenges,* showing anticipated challenges (pre-implementation) and actual challenges experienced during implementation of M1 (fall 2016) and M2 (spring 2017). In this view it is evident that both middle- and high-school teachers perceived the greatest challenge to be *Time Management* (n=pre-8; M1-9; M2-8). *Managing Content* was perceived initially to be a challenge by over half of the C1 teachers, but tapered off during implementation of M2 (n=pre-6; M1-8; M2-3). *Student Engagement* was also initially perceived to be a potential challenge by one-fourth of the C1 teachers, and only in M2 do teachers again express this concern (n=pre-4; M1-0; M2-4).

The majority of other areas perceived to pose a challenge as shown in *Figure 3* were issues identified by a single individual out of the (15) C1 teachers (either high school or middle school teacher) with the exception of two individuals reporting difficulty with *Understanding How to Implement LDC* during M1 and M2 classroom implementation (n=pre-1; M1-2; M2-2). *Differentiation* was also identified by one C1 teacher in the pre-implementation survey, and comes up again during M2 implementation.

Additionally, it should be noted that *Administrative Support* was identified in the pre-implementation survey (n=pre-1), and dropped off during actual implementation,

FIGURE 3: LDC Implementation Challenges



suggesting that the Implementation Team strategy to support regular updates or other modes of communication with District level administrators (District Liaisons, HSTW on-site coaches), and holding an orientation session (August 2016), planning meetings, and presentation of progress events with school administrators (December 2016, January and May 2017) helped to inform district staff about the project in ways that gave teachers confidence during implementation with adequate support. Also, *Managing Accountability in Group Work* (n=pre-1) and *Keeping Students on Task* (n=M1-1) also dropped off as a concern as teachers transitioned from training/planning during September/mid-October to implementation of M1 and M2 during late-October to the end of the spring term. *Using Core Tools*, identified by one C1 teacher during M1 and M2 implementation was addressed by the LDC Coaching Team as noted in the Battelle Education Report (see *Section III*).

It is also important to note that 23% of teachers reported having had PD in Design Cycle Thinking prior to the LDC project (Q3 pre-implementation survey), but only one of the (15) C1 teachers identified *Design Thinking* as a challenge during M2 implementation. This suggests that LDC PD and ongoing coaching support provided adequate preparation for teachers to explore instructional strategies to conduct problem based learning and design thinking as part of the LDC student projects completed in M1 and M2.

Finally, the fact that only one or two C1 teachers expressed difficulty with a range of issues shown in *Figure 3* during implementation of M1 and/or M2 provides insight on training areas that may stall successful implementation during sustaining years when an additional (49) 6-12 teachers. A rollout of LDC training will follow for (263) 6-12 teachers in remaining disciplines, who will have completed training and started implementation of LDC instruction in the classroom. Therefore, these are areas that should be tracked closely to assure that as the number of LDC teachers increases, these challenges pose potential areas that may form barriers to buy-in by teachers who experience difficulty in attaining these essential components of the LDC Science Literacy curriculum.

Research Question EP-4:
What strategies are teachers employing to overcome these challenges in attaining best practices?

The pre/post survey data on C1 teacher confidence level with LDC implementation shows that most teachers reported increased confidence (*Very Confident* or *Confident*) by the end of the grant year in the following components of the LDC project (see Q6 in the Supplementary Survey 10/14/16, and Q38 in the Post-Implementation Survey 3/24/17). *Figure 4: How Confident are Teachers with Module Implementation*, shows the following areas where teachers gained in confidence with LDC strategies:

- Navigating online resources
- Collaborating with LDC teachers
- Developing a Quality Instructional Plan
- Developing instruction to support student demonstration of skills
- Using the student scoring guide/ongoing checks
- Constructing an authentic Science Literacy Assignment
- Identifying a focused set of science standards
- Selecting content rich texts
- Selecting a student work product relevant to student LDC learning goals
- Backward Designing a sequence of skills to support student LDC learning goals

Only one area of LDC implementation showed a slight shift reflecting a lower confidence level concerning the ability to "*identify a focus set of common core literacy standards to drive the assignment*." This issue was identified as an area for increased support by the BEd PD team (see *Section III*) and resulted in several modifications to PD instruction for both C1 and C2 teachers.

Teachers were also asked to identify components of the implementation experience that were most helpful to achieve LDC implementation in their classrooms (Q34). *Table 5: Classroom Implementation Support*, shows five areas identified by both middle-school and high-school C1 teachers.

FIGURE 4: TEACHERS CONFIEDENCE WITH MODULES

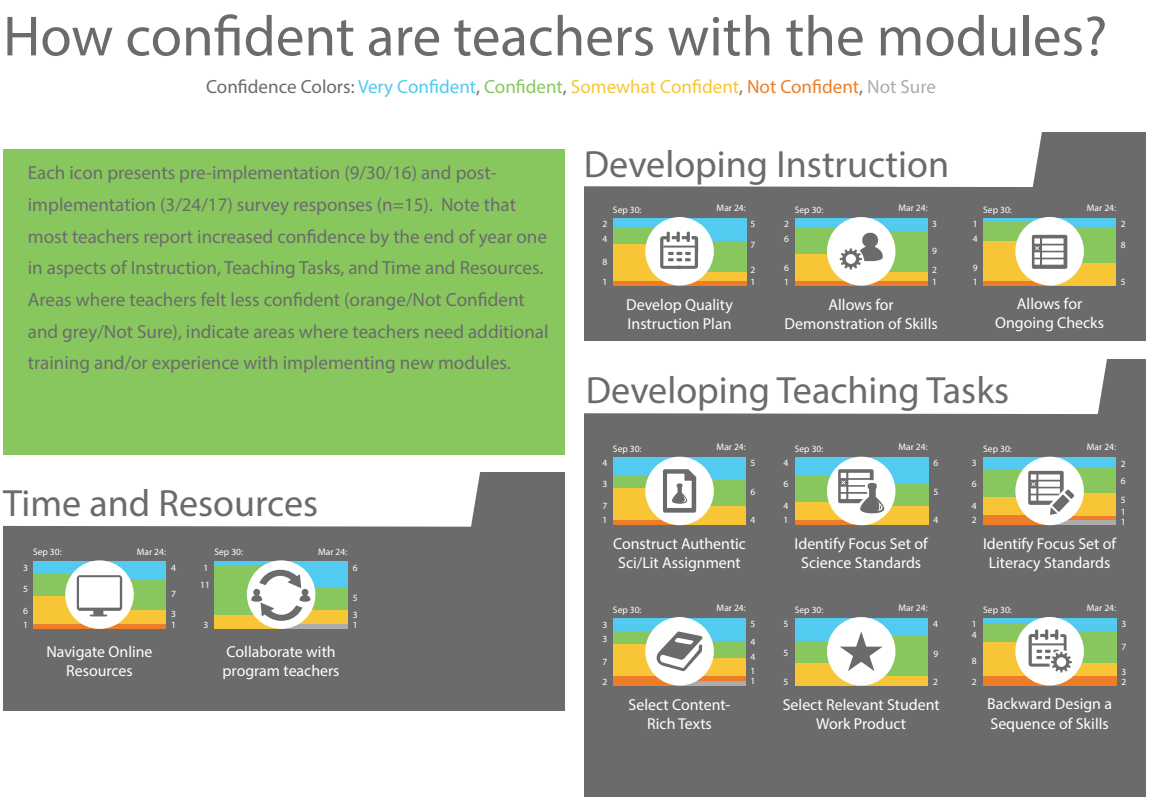


TABLE 5
Classroom Implementation Support

Helpful Aspects	Teacher Grade Level	
	Grades 5-8 (n=5)	Grades 9-12 (n=8)
Using Core Tools	✔	✔
Learning new ways to teach	✔	✔
Access to coaches	✔	✔
Professional development sessions	✔	✔
Doing a second module	✔	✔
Collaboration with other LDC teachers	✔	
Having a model	✔	
Access to the LDC library	✔	
Researching topics		✔

**One teacher identified as teaching grade levels 5-12.*

Teachers were also asked about the importance of ongoing access to LDC coaches during implementation of M1 and M2 (Post-implementation Q35), and importance of on-site coaching (Post-implementation Q36). Ongoing access to LDC coaches beyond the PD days via email, or through review and comment by coaches on work-in-progress posted to Core Tools, or on-site coaching visits were identified as *Very Important* or *Somewhat Important* by 93% of C1 teachers. Just over two-thirds of C1 teachers said that on-site coaching was *Very Important* or *Somewhat Important* to their success during implementing M1 and M2 in their classrooms.

A complete description of the LDC PD plan and modifications made, data used to inform modifications, and ongoing interaction and assessment of C1 teacher progress with implementation of science M1 and M2 is presented in *Section III* and *Section IV* of this report.

Research Question EP-5:
What evidence in student performance shows improvement from increased exposure to science concepts and development of STEM skills through hands-on problem based learning and design cycle thinking?

Comments on the project Evaluation Plan from ODE (submitted 10/31/16) regarding use of the Science LDC student rubric to conduct student assessments suggested that the validity of the rubric as an assessment tool could be difficult to establish. Use of the rubric during early stages could be problematic concerning bias in subjectivity in evaluating student work for teachers with little experience in calibrating scoring of student work using consistent criteria appropriate to grade levels. These comments helped to direct the project to focus on student test data as a more reliable comparative assessment for baseline and the sustaining years of the project (2017-22).

A review of the Rural Collaborative districts end-of-course tests across grades 5-12 was conducted by the Project Manager to identify common tests used in each district. Additionally, review of the ACT exam STEM scoring system confirmed that ACT has recently determined a reliable assessment of readiness for college level STEM courses based on integrated test scores in science and math (see *Appendix G: ACT Research and Policy Technical Brief, 2015*). The technical brief also addressed the use of the ACT STEM score "in relation to the likelihood of succeeding in a variety of STEM-related college outcomes: cumulative grade point average (GPA) over time, persistence in a STEM major, and ultimately completing a STEM degree." Additionally, end-of-course exams in English Language Arts will also be tracked for grades 5-12 as a measure of potential improvement in exposure to technical reading and writing that is inherent to the goals of LDC Science Literacy curriculum. A detailed description of the student performance-tracking instrument is discussed in detail in *Section II* of the Rural LDC Year End Report 2016-17.

CONCLUSIONS

The implementation year of the Straight A Grant funded *Rural Collaborative to Improve Instruction and Expand Student STEM Opportunities and 21st Century Skills through Literacy Design Collaborative,* has demonstrated an effective strategy to establish implementation to full scale as outlined in the grant proposal. In the following sections of this report (*Sections II, III,* and *IV*), Project Partners provide specific details of the work conducted during this implementation year, and outline plans for sustaining years beginning with 2017-18.

Evaluation during the sustaining years will occur only in 2017-18 based on conducting a pre/post implementation teacher survey tested and modified during the implementation year. Additionally, a student assessment reporting template providing a tracking instrument, assures that Rural Collaborative Districts will report relevant year-end student performance data consistently during the grant period through 2022.

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Rural Collaborative to Improve Instruction and Expand Student STEM Opportunities and 21st Century Skills through Literacy Design Collaborative (LDC)

Section I: Evaluation

Submitted by:
Monica Hunter, Ph.D, Director of Research
Maria Green Cohen, Assistant Director of Research
Kayla Galloway, Research Assistant
Grayson Rudzinski, Design Researcher

PART 4: Appendix F

July 31, 2017

THE
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LDC Pre-Implementation

Infographic Summary of Survey Data, Cohort 1

by Monica Hunter, PhD., Maria Green Cohen,
Kayla Galloway, and Grayson Rudzinski

Objective:

Share feedback from teachers participating in the Rural LDC Project at the outset of implementation.

Table of Contents:

Who took this survey?

They have experience teaching:

Science	**14**
Career Tech	**5**
Math	2
Social Sciences	2
Agriculture	2
English	1
Health	1
Strength Training	1

15 Teachers

Mapleton Local Schools

Loudonville-Perrysville Exempted Village Schools

Black River Local Schools

Hillsdale Local School District

Northwestern Local Schools

Three Teachers from Each District

6 Middle School (5-8)

2 Teach Both

9 High School (9-12)

60% Have experience teaching other teachers.

How did they get involved?

10 Selected by Principal

4 Selected by District Admin

1 Volunteered

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What methods are teachers using?

Frequently Use:

Most teachers (60-87%) use these methods **weekly or monthly**.

Cooperative Groups
Working in groups to deepen understanding of content.

Science Equipment
Using science equipment to perform lab activities and use data collected to complete written assignments in class.

Computers/Tech
Requiring students to use computers/tech to complete an assignment or project.

Assigned Readings
Assigning a reading beyond the textbook.

Vocabulary
Requiring students to use vocabulary from the subject being taught to complete assignments.

Tables and Graphs
Having students develop and analyze tables, charts, and graphs.

Occasionally Use:

Some teachers (40-47%) use these methods **weekly or monthly**.

Presenting
Having students orally defend their thinking in front of peers.

Data
Having students use data they have collected to justify their conclusions.

Group Writing
Requiring student groups to complete a written product as a project component.

Compare/Contrast
Requiring students to compare and contrast information from one text to another.

Extended Projects
Working on an extended major project that lasts one week or more.

Rarely Use:

Few teachers (20-34%) used these methods **weekly or monthly**.

In-depth Explanations
Requiring students to write in-depth explanations about an activity or project.

Supporting Evidence
Having students defend their thinking with supportive evidence from readings.

Open-ended Problems
Working on problems with no obvious solutions.

Real-life Problems
Addressing real-life problems in writing assignments.

Essay-based Tests
Giving a test that is predominantly essay questions.

Science Readings
Reading science-related texts and demonstrating understanding through writing.

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What challenges are teachers expecting?

Student Interactions

Student Expectations
Getting students to switch mindsets.

Student Engagement
Building enthusiasm and student buy-in.

Managing Groups
Effectively grouping students so all members participate.

Differentiation
Responding to the needs of all learners.

Logistics

Time Management
Having enough time to plan and implement.

Managing Content
Covering necessary standards associated with the problem.

Admin Support
Building leaders' understanding of LDC and support for implementation.

Access to Resources
Gathering materials to complete projects.

100%

of teachers think it is either **Very or Somewhat Important** for **Administrators** to understand the LDC instructional strategies teachers are implementing.

80% think it is **Very Important.**

87%

think it is **Important** for **Parents** to understand the LDC model.

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How confident are teachers with the modules?

Confidence Colors: Very Confident, Confident, Somewhat Confident, Not Confident

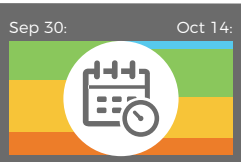
How prepared do teachers feel?

	Sep 30:	Oct 14:
Felt Well Prepared	1	5
Wanted One More Meeting	10	2
Wanted On-site Support	6	2
Wanted Brainstorm Session	3	3
Wanted LDC Coach Access	8	9

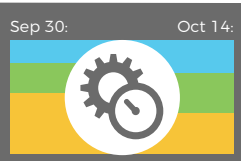
How do teachers rate their first module?

	Sep 30:	Oct 14:
Good to Go, with As-Needed Modifications	4	9
Needs Work Before Implementation	10	5

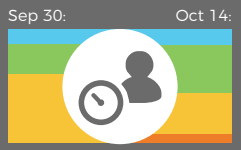
Time and Resources



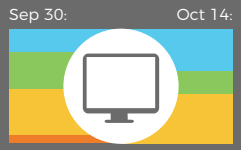
Time to Revise



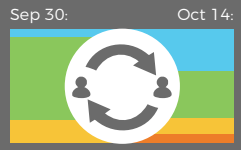
Time to Implement



Time to Work with Coaches

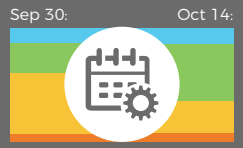


Navigate Core Tools

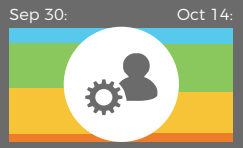


Collaborate with LDC teachers

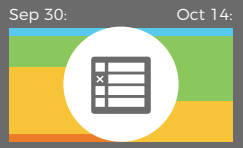
Developing Instruction



Develop Quality Instruction Plan

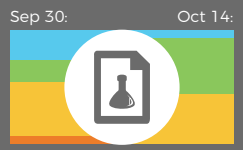


Allows for Demonstration of Skills

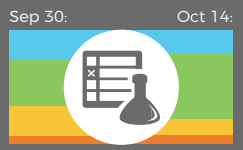


Allows for Ongoing Checks

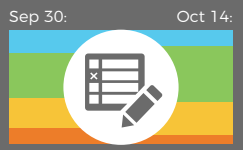
Developing Teaching Tasks



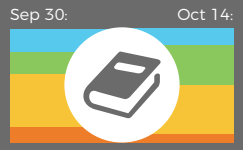
Construct Authentic Sci/Lit Assignment



Identify Focus Set of Science Standards

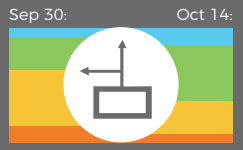


Identify Focus Set of Literacy Standards



Select Content-Rich Texts

Select Relevant Student Work Product



Backwards Design a Sequence of Skills

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What do teachers think about Design Thinking/PBL?

What is it?

Characteristics

Open-ended
Working on problems with no obvious solutions.

Real World
Connecting learning to the real world.

Nontraditional
Moving away from lectures and teaching to the test.

Methods

Develop Products
Developing a product to meet a specified need.

Structure
Scaffolding learning with step-by-step instruction.

Applied Learning
Connecting content to application.

Hands-on Learning
Producing something tangible.

Student-led
Teacher acting as a "guide on the side."

Engineering
Introducing engineering design principles.

What are the benefits?

Student Skills

Problem Solving
Giving students experience with finding solutions.

Critical Thinking
Developing reasoning skills.

Collaboration
Helping students build the skills they need to work well in teams.

Communication
Building student skills in expressing ideas effectively.

Creativity
Fostering generative and creative skills.

Research
Conducting studies to discover new knowledge.

Organization
Building good habits for managing time, resources, and ideas.

Student Growth

Engagement
Building enthusiasm and student buy-in.

Learn from Mistakes
Finding pathways forward through evaluating what went wrong.

Big Picture
Encouraging students to look for the wider relevance of their work.

Ownership
Giving students a sense of investment in their work.

Confidence
Helping students feel pride in their work, their skills, and in themselves.

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What is the anticipated impact on student performance?

Middle School:


Writing Skills


College & Career


Design Process


Learn from Mistakes


Risk-taking


Teacher Growth

Both:


Engagement


Content Retention


Student Growth


Reading Fluency


Differentiation

High School:


Problem Solving


Critical Thinking


Higher Quality Projects


Student Buy-in


Time Management

Our Methodology:

This report provides an infographic overview of survey data collected from teachers engaged in the first year of implementing Straight A funded Rural LDC Project. Project districts include: Northwestern Local Schools, Mapleton Local Schools, Hillsdale Local School District, Loudonville-Perrysville Exempted Village Schools, and Black River Local Schools.

The Rural LDC 2016 Teacher Pre-Implementation Survey (35 questions) was administered on September 30th during the second day of a two-day LDC professional development session. The survey was completed by a total number of (15) teachers. A supplemental survey (6 questions) was administered on October 14th, and was completed by a total number of (14) teachers.

The survey was administered via a secure web-based platform (SurveyMethods®), designed for conducting confidential and anonymous surveys.

About PAST KC:

PAST Foundation has over 16 years of experience working in schools nationwide. The Knowledge Capture Team provides evaluation services necessary to support project implementation and grant reporting.

Through our work, we have seen this approach guide real-time course correction, advancing both short-term and long-term goals that achieve critical outcomes.

Our Knowledge Capture program includes systematic analysis of transformative processes supporting successful K-12 STEM education initiatives. This is especially important for multiple-year implementation processes that often rely solely on student performance on standardized tests as the only measure of positive change.

PAST can help you track and prove your success.

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LDC Post-Implementation

Infographic Summary of Survey Data, Cohort 1

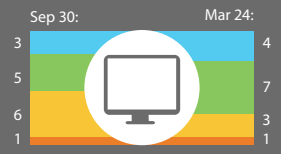
by Monica Hunter, PhD., Maria Green Cohen,
Kayla Galloway, and Grayson Rudzinski

How confident are teachers with the modules?

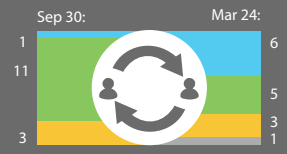
Confidence Colors: Very Confident, Confident, Somewhat Confident, Not Confident, Not Sure

Each icon presents pre-implementation (9/30/16) and post-implementation (3/24/17) survey responses (n=15). Note that most teachers report increased confidence by the end of year one in aspects of Instruction, Teaching Tasks, and Time and Resources. Areas where teachers felt less confident (orange/Not Confident and grey/Not Sure), indicate areas where teachers need additional training and/or experience with implementing new modules.

Time and Resources

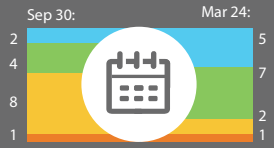


Navigate Online Resources

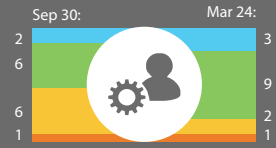


Collaborate with program teachers

Developing Instruction



Develop Quality Instruction Plan



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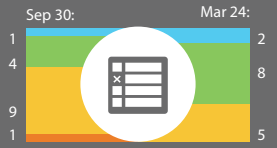
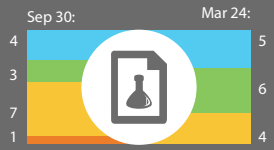
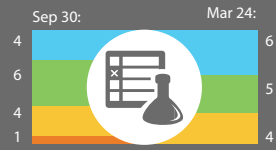


Allows for Ongoing Checks

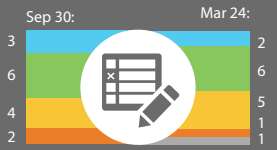
Developing Teaching Tasks



Construct Authentic Sci/Lit Assignment



Identify Focus Set of Science Standards



Identify Focus Set of Literacy Standards

Select Content-Rich Texts

Select Relevant Student Work Product

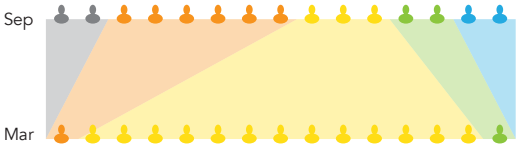
Backward Design a Sequence of Skills

Instructional Strategies

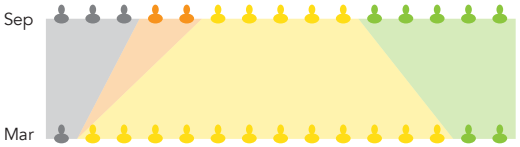
Classroom transition to LDC Science Modules

Never, **1-2 Times a Year**,
1-2 Times a Semester, **Monthly**, **Weekly**

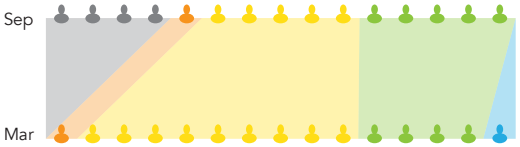
Indepth Explanation Writing



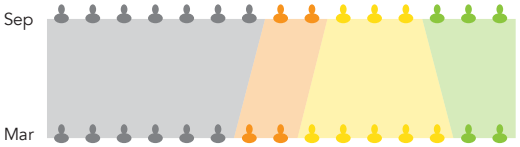
Defending Writing with Evidence



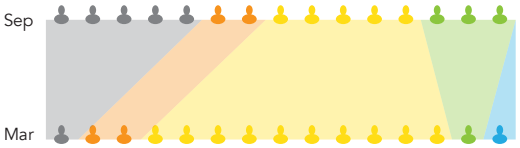
Open-Ended Problems



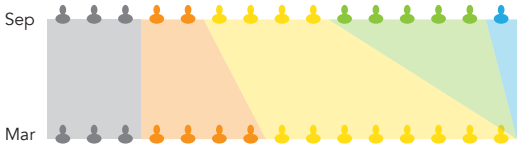
Essay-based Tests



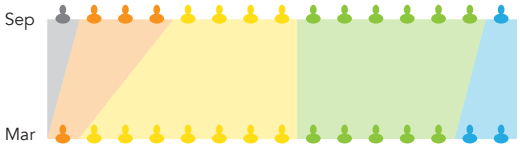
Addressing Real-Life Problems



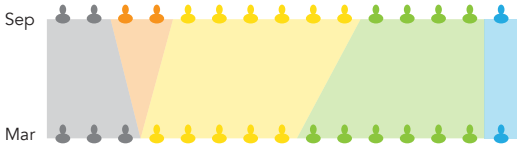
Orally Defend Conclusions



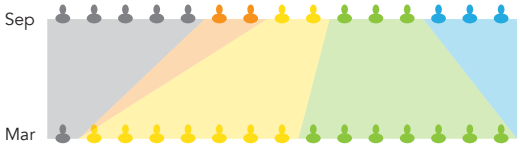
Use Data to Justify Conclusions



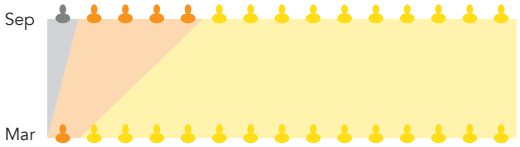
Science Reading Comprehension



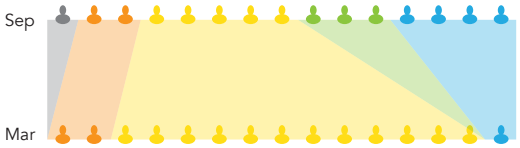
Compare and Contrast Information



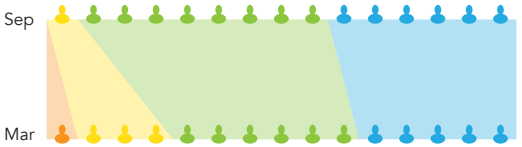
Extended Projects



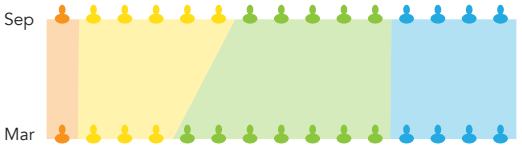
Groups for Written Components



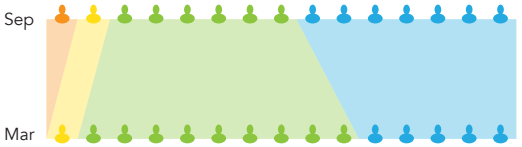
Cooperative Groups



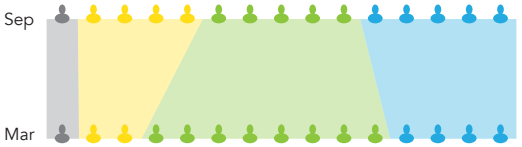
Using Science Equipment



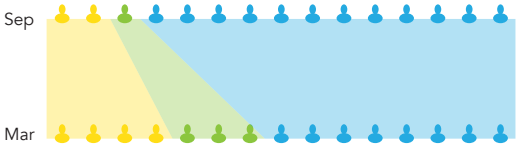
Using Tech/Computers



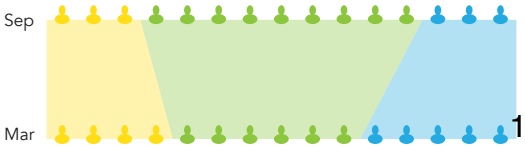
Additional Reading Beyond Textbook



Using Subject Vocabulary

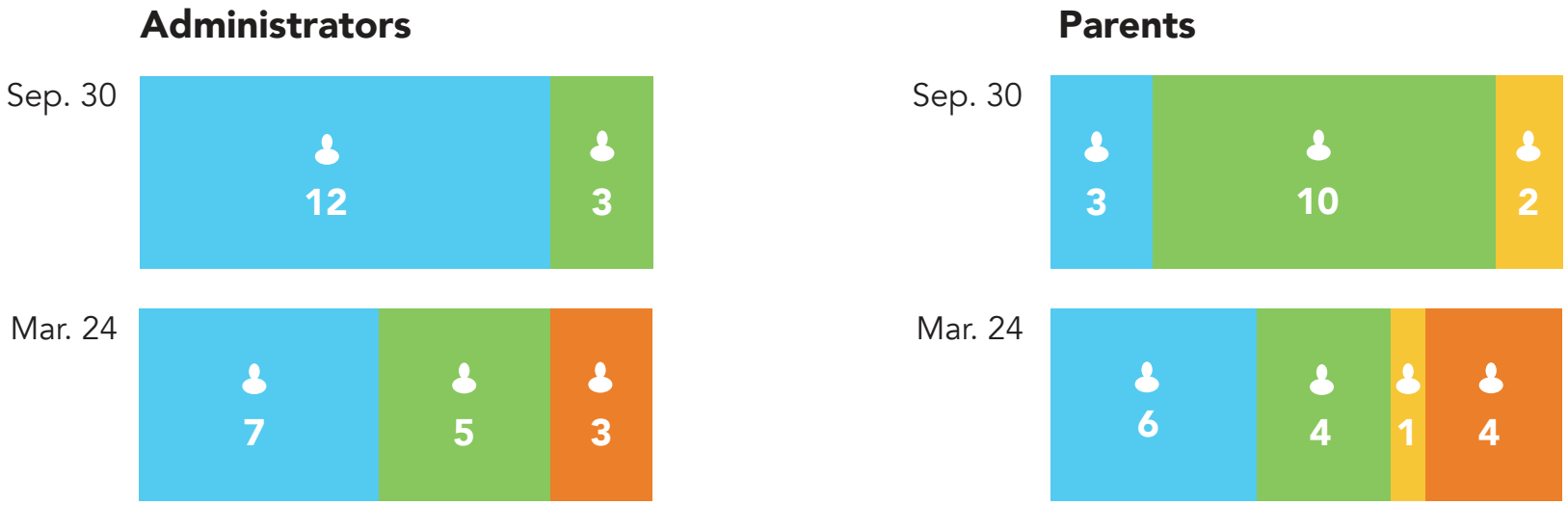


Using Tables and Graphs



Communication of LDC Implementation

How Important is it that they understand the LDC instructional strategies that you implemented in your classroom this year?



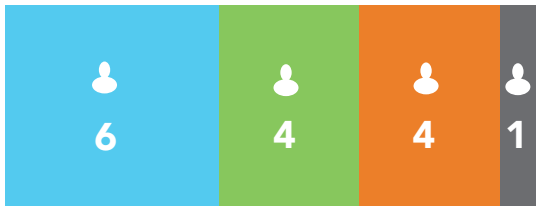
During the first year of LDC implementation do you think that they were provided sufficient information to understand the LDC Science and Literacy Project?

Teacher LDC Support Needs

How important was it for you to have on-site coaching and ongoing access to LDC coaches during the first year of implementation of LDC modules in your classroom?

On-site Coaching (Mar. 24)

Mar. 24



Access to LDC Coaches

Sep. 30

Mar. 24

Very Important, **Somewhat Important**, **Not sure**, **Not Important**, **Other**

Who are LDC teachers collaborating with?

Source: HSTW Fall 2016

10	8	3	3	4
with other teachers	with LDC teachers	with other districts	with the community	with **no one**

LDC Implementation Challenges

This timeline illustrates the challenges teachers expected to encounter (Pre-Implementation) with challenges teachers identified while implementing Module 1 and Module 2.