

Scaling an Evidence-Based National Model of Instructional Systems' Success

I. Introduction and Significance

(1) National Significance (5 points)

The Literacy Design Collaborative (LDC) recently demonstrated strong evidence of effectiveness in improving student learning: statistically-significant and large effects' sizes of 0.37 for middle school students in LDC's just completed EIR Mid-Phase predecessor program (Investing in Innovation Validation) and would utilize this grant to scale and replicate this national model of tech-enabled instructional systems coherence and middle school student impact.¹ LDC's instructional systems approach integrates all three generally siloed instructional subsystems — curriculum, assessment, and professional development — through student engagement with *measurably* effective instruction of rigorous ELA, science, and social studies state standard content, by *measurably* effective teachers.

LDC, an entrepreneurial EdTech non-profit, generated this fully articulated and scalable model from field-initiated — and more importantly field-tested and iterated — innovations that, in effect, guarantee the decades' long promise of rigorous college ready standards (Common Core [CCRS], Next Generation Science Standards [NGSS]; College, Career & Civic Life [C3]) realized in the classroom and measurable in both student standards performance and teacher skill demonstration. At the core of LDC's systems' approach are student writing performance tasks validated to CCRS, NGSS, and C3 by grant partner, the Stanford Center for Assessment Learning and Equity (SCALE) which serves as SBAC advisors, item writers. Both of these — curriculum-embedded formative assessment student performance tasks and their effective instruction — as well as the students resulting performance demonstration are measured through SCALE's tech-enabled, rater-reliable calibrated measurement, enabling LDC to realistically guarantee objectively rigorous instruction — or, unfortunately, objective confirmation of its absence. When absent, LDC's online real-time PD and OER curricula and assessment resources immediately can be used to target student challenges — and improve teacher skill.

LDC's systems approach to implementing and measuring the success of standards in

¹ LDC's mid-phase grant was completed in June 2020 under the EIR-predecessor Investing in Innovation (i3) program.

classrooms addresses a clear, continuing national problem of practice. Despite the promise of the college and career standards in 2010 and the more recent NGSS and C3 (both 2013), NAEP and PISA show only flat or decreasing performance in reading and math.

- 2019 NAEP scores actually decreased for both 4th and 8th graders from 2017 with an overall 34% proficiency rate.
- 2018 international PISA scores continued 50 years of stagnation with the United States still relegated to 36th — the middle of the pack and below nearly all western European countries

The problem is especially acute in science, where a prominent national panel urged intensive professional development and materials development prior to holding schools responsible for NGSS.²

Many proffered solutions today seek to “work around” teachers — students engaged with putatively silver-bullet technology, teacher-proof curricula (as if curricula teaches itself), two teachers to every classroom, or non-scalable in-person coaching of highly variable and uncertain quality. This grant does not seek to “work around” the teacher but instead puts the student at the center of engaged, collaborative — and nationally-calibrated and measurable — teacher-facilitated learning. In doing so, LDC seeks to address both the acute impact of COVID on learning opportunities for students as well as rapidly build the skill of teachers, particularly the ‘early-skilled,’ less effective teachers too often assigned to our neediest populations — an EIR invitational priority.

The extraordinary events of the past year have exposed the failure of our education system to meet the needs of every student. As schools across the country transitioned to remote learning, educators struggled with a lack of guidance, tools, and know-how to support quality instruction. If continuity of learning occurred, it often lacked depth. While many students lost ground, those who lost the most were those already behind exacerbating manifest social, racial, and class divisions.³

The problems that underlie this breakdown have long been in American education. The too-often siloed, core drivers of instructional rigor — professional learning, assessment, and curriculum — have been neither of sufficient quality, nor have they functioned coherently together to build and deepen an understanding of academic mastery. This has led to shallow implementation of academic standards, which disproportionately affects already underserved communities.

² National Research Council. 2014. *Developing Assessments for the Next Generation Science Standards*. Washington, DC.

³ Emma Dorn, Bryan Hancock, Jimmy Sarakatsannis, and Ellen Viruleg, COVID-19 and student learning in the United States: The hurt could last a lifetime, McKinsey & Co. (June 2020)

LDC launched in 2009 to address precisely this central and systemic problem long before the coronavirus outbreak closed school buildings last spring. A decade ago, as states adopted more rigorous college and career ready standards, significant implementation challenges surfaced. For students to master these new expectations, teachers needed to understand these expectations deeply and as realized in practice by students in classrooms. With this premise in mind, LDC designed a tech-enabled approach and online architecture for building first the capacity of teachers and then administrator-supported school instructional systems to move all students towards mastery. Teachers learn together — by far the most student impactful — in their common planning time in inquiry teams or professional learning communities (PLCs). In this way, instead of ignoring teachers, LDC has doubled down on teachers — but teachers effectively supported by their school’s Instructional Leadership teams (ILTs), which engage in linked, parallel LDC PD learning. PLC teachers on a grade enact standards through student-centric performance writing tasks in science, social studies, and ELA, generating formative data that informs students in their learning trajectory while illuminating to teachers and the ILT what classroom teachers need to do next to iterate and differentiate instruction to guarantee success for all students — particularly high need students struggling to catch up.

In this way, LDC’s grant application addresses Absolute Priorities 1 and 2: LDC’s 0.37 statistically significant effects size and the several other independent research findings cited are more than “moderate evidence”. As described below, LDC launched as an Improvement Network in which all user-centered design and educator classroom testing involved repeated cycles of field-based innovation, data collection, and iteration. LDC also addresses the inequity of poor teacher quality and curriculum/assessment through remote learning meeting both invitational priorities as well.

(2) Project Contribution to Increased Knowledge of Educational Problems, Issues, or Strategies

LDC addresses several key issues and strategy foci of the past several decades in operationalizing long established research-and theory-driven principles supporting school reform and improved teaching and learning. Thus, this project will provide central contributions to critical education research, including coherence and alignment of the Instructional Core (*Elmore*)⁴; effective professional development (*Darling-Hammond, Hyler, & Gardner*)⁵; the effect on integrating content

⁴ Richard Elmore, *In Conversation: Leading the Instructional Core*, Summer 2010 – Vol. 11 Issue 3, page 6.

⁵ Darling-Hammond, Hyler, Gardner (2017). Effective teacher professional development. Learning Policy Institute.

and literacy development on the depth and range and depth of student learning (*Akerson; Draper*)⁶; the power of formative assessment and data use (*D. Williams*)⁷; and the role of leadership and teacher engagement in change (*J. Killion et al.*).⁸

Ten years after the introduction of the first new standards, piecemeal and sporadic interventions have not improved the quality of instructional content and delivery. Curricular rigor remains weak. Organizations like LDC that can implement scalable, measurable coherence across curriculum, assessment, and PD are rare. Though students putatively perform well nationally on their school assignments (71% success rates), very few of those assignments — **only 17%** — are actually grade level.⁹ Most teachers — 82% nationally — believe that their state standards articulate important academic expectations, yet only 44% believe their students can actually meet those expectations. (*Id.*) LDC’s effective, virtual, and well-established systems approach — a tech-enabled measurable, and fully scalable solution — increases knowledge and understanding on effectively addressing these core national educational challenges.

LDC’s approach at scale (100+ schools) and serving predominantly disadvantaged (EIR-target) middle school students in the Los Angeles Unified and New York City districts, showed statistically significant learning gains and large positive effects sizes over a matched comparison control group of students, controlling for prior student, teacher, and school performance, and all student demographics (FRL/EL/Sped/ethnicity) (What Works Clearinghouse certification). CRESST’s quasi-experimental study showed that among LAUSD middle school students receiving LDC instruction, the “effect sizes translated to a striking 9.4 months of additional learning compared to similar peers.”¹⁰ Like LAUSD, New York City students in just their first year of teacher learning saw remarkable growth in ELA test scores with large effects sizes translating to 7.1 months of

⁶ Akins, A., & Akerson, V. L. (2002). *Connecting Science, Social Studies, and Language Arts: An Interdisciplinary Approach*. Educational Action Research, 10(3), 479-498. Draper, R. J. (2008). *Redefining content-area literacy teacher education*. Harvard Educational Review, 78(1), 60-83.

⁷ Wiliam, D. (2007). *Changing Classroom Practice*. Educational Leadership, 65(4), 36.

⁸ Killion, J., Harrison, C., Colton, A., Bryan, C., Delehant, A., & Cooke, D. (2016). *A Systemic Approach to Elevating Teacher Leadership*. Learning Forward.

⁹ New Teacher Project (Sept. 2018). [The Opportunity Myth: What Students Can Show Us About How School Is Letting Them Down—and How to Fix It](#). (N=20,000 students)

¹⁰ Wang, J., Herman, J. L., et. al. (2020). *Literacy Design Collaborative 2018–2019 evaluation report* (Report 867). Univ. of Calif, Los Angeles, National Center for Research on Evaluation, Standards, and Student Testing (CRESST).

additional learning over matched-pair, control students.¹¹ Such large effects sizes are “rarely seen” in public education efforts. (*Id.*)

LDC succeeds by realizing well established but unsuccessfully implemented conceptual research — basic research that underpins both NGSS and CCRS assessments, operationalizing Elmore’s Instructional Core and “Task Predicts Performance” as well as Dylan Wiliams curriculum-embedded formative assessment. As Elmore articulated over a decade ago, higher standards are not enough.¹² Interventions must effectively address all three strands of Elmore’s Instructional Core simultaneously: better curricular materials (e.g. lesson-plan scaffolding students grappling with using complex texts); support for *measurable* teacher skill development; and student-centered engagement. LDC’s denominated ‘Enacted Curricula’ systems approach produces all three Elmore demands, unified with measurable efficacy: students regularly engage with SCALE-validated performance tasks instructed by teachers with SCALE- credentialed standards implementation skills. SCALE-vetted performance tasks do double duty as curricula and curriculum-embedded formative assessment as they measure student standards mastery using LDC’s real-time online technology.

Effective formative assessment “doubles” the speed of student learning,¹³ second only to teacher skill in improving student outcomes.¹⁴ The “bridge between teaching and learning — only through some kind of assessment process can we decide whether instruction has had its intended effect”¹⁵ — formative feedback has a .90 effect on student learning outcomes regardless of a student’s age or special needs status.¹⁶ Moreover, formative assessment not only provides evidence of a student’s progress, it also provides feedback to that student’s teacher on the effectiveness of their

¹¹ Wang, J., Herman, J. L., et. al. (2019). *Literacy Design Collaborative 2017–2018 Evaluation Report for New York City Department of Education*. (CRESST).

¹² E.A. City, R.F. Elmore, S.E. Fiarman, L. Title (2009). *Instructional Rounds in Education: A Network Approach to Improving Teaching and Learning*. Harvard Univ. Press. “What about content and performance standards? Standards only operate by influencing the level of the content that’s actually being taught; their effect in actual classrooms depends on whether there are materials that reflect the standards, whether teachers know how to teach what the materials and standards require, and whether students find the work that they are being asked to do worthwhile and engaging.... If you change any single element of the instructional core, you have to change the other two. If you raise the level of content without changing the level of knowledge and skill that teachers bring to the content, you get what we see with considerable frequency in American classrooms: low-level teaching of high-level content.”

¹³ Wiliam, D. (2011). *Embedded Formative Assessment* (p. 36). National Educational Service.

¹⁴ “Formative assessment produces greater increases in student achievement and is cheaper than other efforts to boost achievement, including reducing class sizes and increasing teachers’ content knowledge” [NCTM,
https://www.nctm.org/Research-and-Advocacy/research-brief-and-clips/Benefits-of-Formative-Assessment/](https://www.nctm.org/Research-and-Advocacy/research-brief-and-clips/Benefits-of-Formative-Assessment/).

¹⁵ Wiliam, D. (2014). *Formative assessment and contingency in the regulation of learning processes*. London: Institute of Education, University of London.

¹⁶ Hattie, J. (2009). *Visible Learning: A Synthesis of Over 800 Meta-Analyses Relating to Achievement*. Routledge.

chosen teaching strategies. LDC’s SCALE-validated performance writing tasks embed in existing district or school curricula realizing Wiliam’s powerful aspiration.

LDC’s model will contribute evidence and research to confirm that these conceptual theorems can be practically and effectively implemented at scale particularly for the ‘early skilled’ and early career teachers the Federal Register notes are inequitably distributed to the highest need schools.

II. Strategy to Scale (20 points)

(1) Strategies to Overcome Barriers to Scale (15)

This grant would be used to overcome several key barriers that in the past have undercut LDC’s scale efforts. These barriers can be categorized as: (1) human challenges, (2) technology development needs (including increased and automated data tracking and calibration), and (3) additional disciplinary OER performance tasks to ensure seamless curricular integration.

Barriers		
Human	School Culture resistance to remote Learning by both teachers and students	Need to embed explicit ILT learning processes into school instructional systems to sustain post-grant school capacity
Technology	Online automating of manual ILT capacity building learning processes (paralleling PLC online learning)	User-centered design of currently manual data tracking and integration of ILT and student rubric scores with existing PLC clickstream data dashboard reports (below)
Content:	Student Work Scoring: Additional student work collection and expert scoring to improve existing online PLC & ILT calibration to accelerate real-time student and adult learning	Additional authentic disciplinary (science, social studies, ELA) student product progression online course content (vertical articulation of standards representation in additional student products) for any curricula

The first — resistance to remote learning by both adults and students — was ironically, of course, ameliorated by the pandemic. Whether done well or not, at least the cultural resistance to 21st century technology tools has somewhat dissipated. When LDC launched its i3 Validation grant in 100+ schools in NYC and LAUSD in 2015, LDC used what was then a relatively new technology — Zoom video-conferencing — to meet with teachers in 100+ schools every week in their PLCs. Generally, but not always, teachers embraced LDC’s synchronous Zoom-coached PLC meetings and asynchronous PLC navigation through LDC’s CoreTools dynamic learning courseware — a kind of

Khan-Academy-for-adult-learners — to learn how to implement standards in a kind of tech-enabled Japanese lesson study (i.e. rigorous lessons were implemented each week with attendant student work review). PLC teachers learned together to master 20 measurable standards-instructional classroom skills every week for 26 weeks.¹⁷ At least every two weeks, the PLC analyzed student data to determine whether students were learning from LDC’s standards-driven performance task lessons *and* whether instruction had been sufficiently tailored to support individual student learning or additional follow-up standards lessons were required for certain students. In 2015, LDC was well ahead of school cultural comfort yet through June 2019 trained thousands of teachers in their PLCs via Zoom every two weeks. Likewise, many schools did not have universal comfort using GoogleClassroom to deploy student assignments. The pandemic has mostly cured both of these potential barriers but to the extent any cultural resistance remains, the grant would be used to ensure teacher comfort in their own and their students remote learning through training, improved online navigation, and improved API integration with Google Classroom.

A second human barrier this grant will seek to address is more explicit integration of LDC’s ILT progress monitoring and instructional differentiation systems approach to ensure effective transition post-grant management of rigorous schoolwide standards instruction. LDC’s i3 grant pilot year began as a PLC PD initiative but by the second and subsequent CRESST student state testing measurement years had quickly transformed into our current “Enacted Curricula” model: SCALE-validated writing performance tasks across science, social studies, and ELA used as embedded writing assessment with weekly PLC student work analysis to iterate instruction in real time overseen by ILTs. The ILT progress monitoring was not explicitly in the LDC-school MOUs from the outset which reduced student impact in less committed schools. LDC will formalize this requirement with the benefit of data: ILT-invested LDC schools had better student outcomes. Grant funding will be used as noted below to improve ILT online content, platform experience (LDC’s “CoreTools” platform <https://coretools ldc.org>), and data tracking (LDC tracking the ILT tracking/assisting PLC teachers and students).

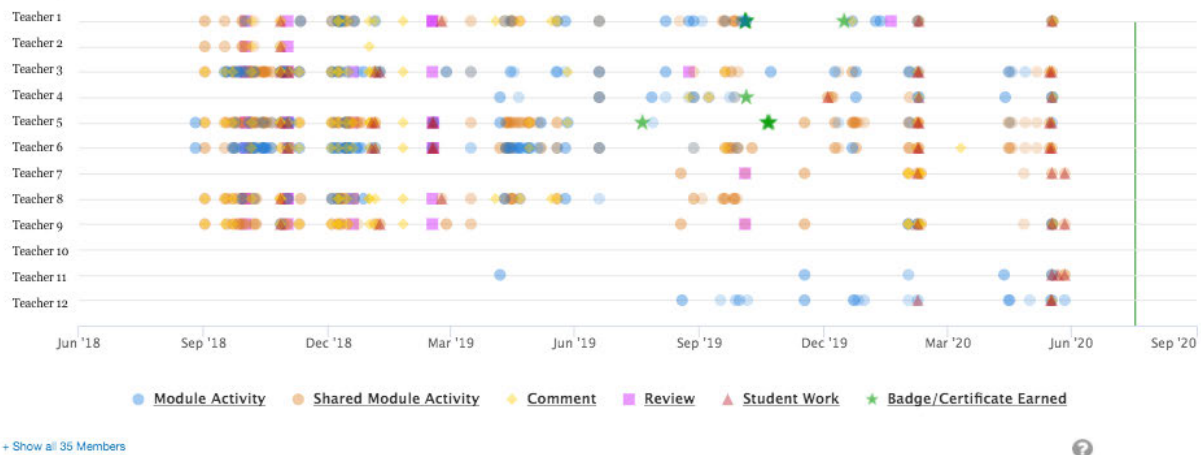
Related to the human challenges, the technology barriers relate to creating both content and

¹⁷ [Standards Instructional Implementation Competencies link](#).

online navigation for ILTs that mimic the yearlong PLC learning processes (and clickstream data reports). Scalability will be significantly improved by codifying offline human-facilitated yearlong ILT learning syllabi, benchmarks, and progress tracking data of standards enactment, student progress monitoring, and instructional iteration. This addresses two scale issues — the post-grant sustainability of school capacity without LDC direct supports and real time data the ILT can use to monitor the learning progress of both teachers and students. Currently, LDC’s model seeks to train teacher PLCs and ILTs in one year, handing off second and succeeding years to ILT management alone. In truth, the current adult gradual release model typically requires LDC to provide second year direct assistance to ILT efforts. This slows impact, school traction, and scaling speed. Codifying online asynchronous ILT content and access to student and teacher real-time progress data permits quicker transition to school ownership — the putative goal of all external PD vendors.

The grant accordingly would be used to engage in user-centered design of ILT data tracking. In LDC’s i3 grant it took 18 months of repeated software sprint cycles to finalize the precursor PLC learning clickstream dashboards of today. It was easy to track individual teacher completion of online courses on implementing standards effectively — including online stealth assessments and SCALE nationally juried assessments of teacher’s instructional artifacts. But to achieve the remarkable 9.4 months additional learning required leveraging the entire PLC, together. Thus, LDC’s 18-month software and content design journey ultimately created clickstream data reports that an assistant principal or principal could glance at to see whether a PLC was progressing: uploading reflectively scored student work, collaborating online with colleagues on instructional content and strategies, securing SCALE-juried microcredentials (and identifying who the teacher stragglers were). For example, the anonymized dashboard report below (from an actual NYC school) shows that teachers continued to learn in LDC’s already existing virtual learning platform (CoreTools) even after the pandemic hit — as did students in GoogleClassrooms engaging in rigorous essay writing even as many schools struggled around the country to assign low-level worksheets.

9 Coaches | 35 Members



The 18-month user testing to combine backend data from LDC’s CoreTools online teacher learning platform can be accelerated for ILT progress tracking to create a parallel ILT tracking report (again, both online ILT member course completion and online clickstream actions reflective of generative ILT instructional decisions).

Capturing Student Progress Data: LDC will also improve CoreTools ability to capture SCALE student rubric standards scores to inform improved real time teacher instructional choices and student choice, including further developing LDC APIs to interface more seamlessly with Google Classroom and its improving student data capture functionality. Capturing and representing student data usefully is critical to effectiveness at scale. PLCs analyze formative student data to confirm students progress against standards (while ILTs review across schools) which has been crucial to LDC’s success. A typical part of Japanese lesson study, such student work analysis including calibration to the nationally-normed SCALE student rubric is manual today but through LDC’s online platform will be tech-enabled, generating more frequent and actionable instructional systems responsiveness.

CCRS arguably are less ELA standards and more “thinking standards” (Analyze, Compare, Describe...). Students must understand the reasoning in what they read to make logical, evidence-based arguments. This ‘thinking’ ability is central to every citizens’ ability to engage with and navigate the sometimes turbulent waters of public and civic discourse. The SCALE student rubric, in turn, measures a students progress against standards, signalling to both student and teacher the next step toward proficiency. For example, both the teacher and student can easily understand the

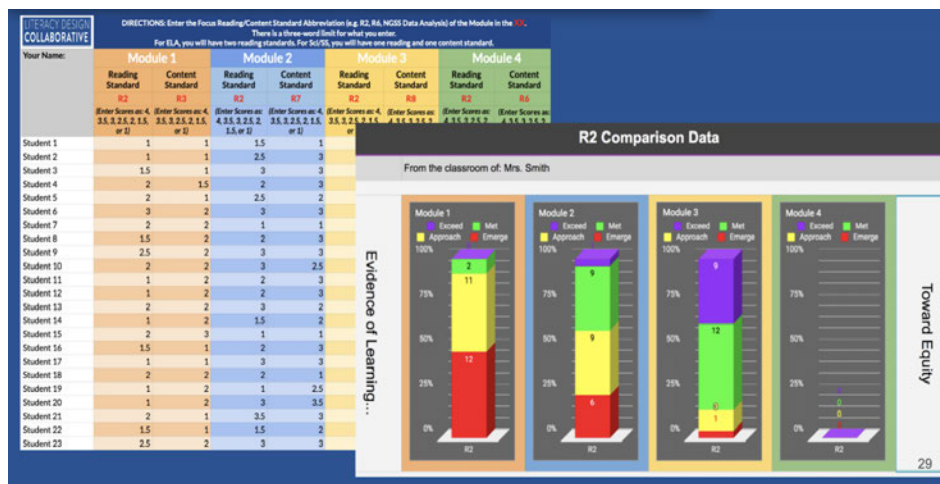
R2 learning progression and next proximal learning steps for the 3rd grade student scoring at 2nd grade level 2 with additional complex text as illustrated in the SCALE-LDC rubric below:

Reading Informational Text Standard 2: Theme/Central Idea

Anchor Standard: Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.

GRADE LEVEL & SCORING ELEMENT		EMERGING	1.5	APPROACHES EXPECTATIONS	2.5	MEETS EXPECTATIONS	3.5	ADVANCED
		1		2		3		4
K	RI.K.2: Identify Main Topic and Retell Key Details ¹	Does not identify the main topic and/or retell details		With prompting and guidance, inaccurately identifies the main topic and/or retells some minor details of the text		With prompting and guidance, accurately identifies the main topic and retells key details of the text		With minimal guidance, accurately identifies the main topic and retells key details of the text
1	RI.1.2: Identify Main Topic and Retell Key Details ¹	Does not identify the main topic and/or retells insignificant details		Identifies the main topic and/or retells some minor details of the text		Identifies the main topic and retells key details of the text		Identifies the main topic and precisely retells key details of the text
2	RI.2.2: Identify Main Topic and Subtopics	Identifies minor details of the text OR Inaccurately identifies the main topic of the text		Identifies the main topic of the text		Identifies the main topic and some subtopics within the text		Identifies the main topic and key subtopics within the text
3	RI.3.2: Determine Main Idea	Recounts minor details of the text OR Inaccurately determines the main idea of the text		Determines the main idea of the text and recounts some related details		Determines the main idea; recounts key details, and describes their connection to the main idea		Determines the main idea of the text; recounts key details in order, and precisely explains how they support the main idea

Currently, the data tables to guide teachers to use this data in meaningful “station rotation” instructional differentiation (i.e. teacher-led mini-literacy lessons for Level 1/2's, student online lessons for Level 3, and collaborative projects/activities for Level 4's) are first-generation spreadsheet pivot tables tracking rubric data for differentiation. For example, in NYC schools, teachers used



these Excel-generated SCALE rubric scores to group students on CCRS R2 and R3 as illustrated.

Grant-funded LDC automation of access and representation in Google Classrooms of this critical student formative progress data — embedded in curriculum as Dylan Wiliam argues for — would be invaluable both to student impact and educator scalability.

Finally, additional content development would be funded to populate the improved teacher and student technology experience noted above. To increase standards clarity expectations for both students and teachers on grade and vertically up grades, funding would enable significantly more student work data collection in all grades and core discipline (science, social studies, ELA) including multiple student disciplinary products for vertical articulation. Expertly scored student work would fuel LDC’s critical online student rubric calibration that would finally manifest the promise of standards: 10th grade student products (rhetorical analysis, lab report, etc.) could be normed from Mississippi to Massachusetts. Online PLC and ILT asynchronous course content will constantly be improved through LDC’s continuous improvement sprint cycles based on educator feedback and student outcomes in double feedback loops. In addition, LDC would continue to populate our OER library of performance writing task anchors with additional prompts. LDC’s prompts (e.g. a social studies analysis of a primary source document ‘MLK’s letter from Birmingham jail’) need to fit in “any curricula” so that they are not external assessments dropped into curricula but rather Dylan Wiliam’s embedded assessment. Accordingly, grant funding would enable LDC to further build out our content bank with Open Educational Resources (OER) tasks to ensure any curricula — EdReports green-rated or not — can embed a SCALE-validated writing performance task.¹⁸

(2) Broad Dissemination Mechanism to Drive Further Development or Replication. (5 pts)

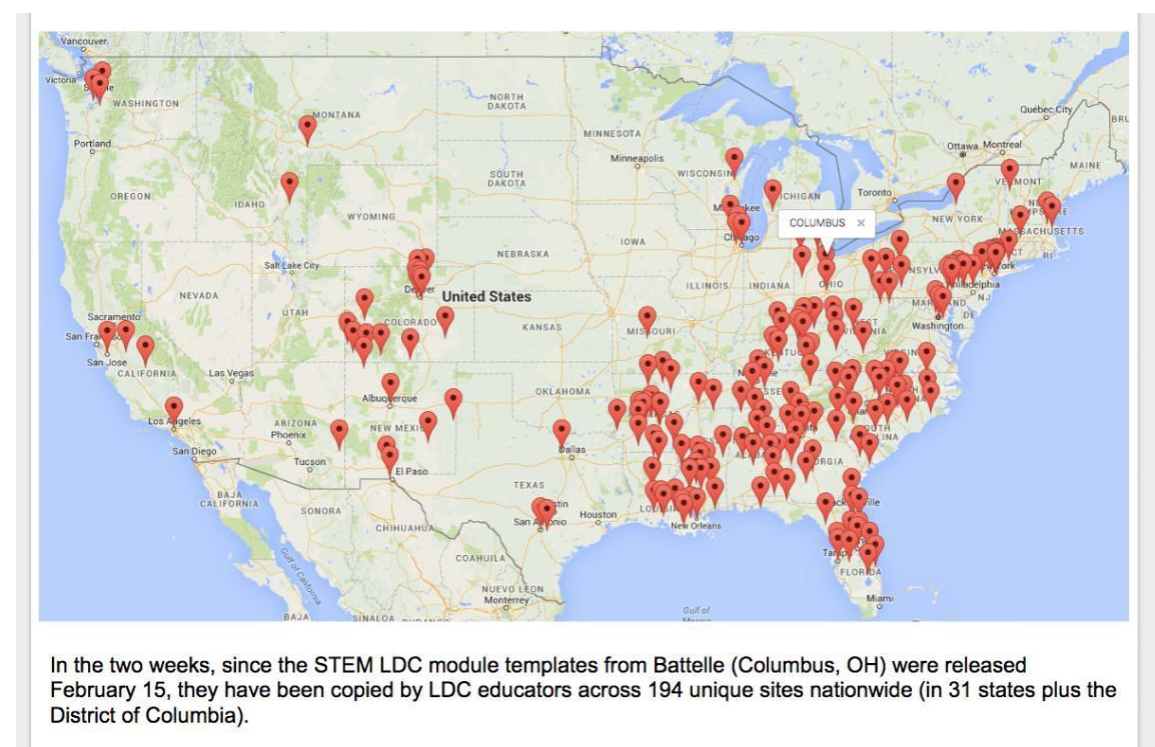
Obviously, LDC and our research and expert partners CRESST and SCALE will participate in the rounds of conferences and convenings, as well as publish findings broadly in academic media and more informally through social media and e-blasts. But more importantly than these traditional mechanisms, LDC as a national network improvement hub has collaborated on many critical educational problems of practice with our partner organizations to develop real-world tests of

¹⁸ EdReports green-rated curricula too often have insufficient writing and DOK Level 4 performance tasks and require more explicit scaffolded literacy lessons for struggling readers due to publishers’ curricula generally pitching to the center of learner performance and with inadequate literacy scaffolding for struggling students.

instructional solution prototypes, with feedback from those tests incorporated and disseminated to educator training and curriculum organizations, SEAs, school districts, and school leaders.

Codification and solution dissemination is a core expertise of LDC as a network improvement hub (Bryk).¹⁹ Accordingly, LDC uses regular virtual (synchronous) community activities to document, showcase, and disseminate all of our work for ease of local adoption and learning feedback loops.

For instance, when the LDC educator community bemoaned the need for more STEM curricular design resources, LDC brought together corporate research scientists from the Battelle Corporation (which manages U.S. energy and WMD research labs like Oak Ridge and Livermore), school trainers from partner Battelle Foundation, Ohio classroom teachers and administrators, and STEM experts to problem ideate, design, rapid prototype, test in classrooms, revise, and then release online STEM resources to build students' science disciplinary skills. Within two weeks of our release of these [LDC-Battelle OER STEM resources](#), educators in 194 districts in 31 states (and DC) downloaded LDC's new STEM resources for use in classrooms across America, as shown in the map below:



LDC partnered with Louisiana spring 2019 to prototype statewide K-1 literacy assessments (for 9,000 students) and with Kentucky summer 2019 to support its statewide new state standards rollout with

¹⁹ <https://www.carnegiefoundation.org/blog/quality-improvement-approaches-the-networked-improvement-model/>
PR/Award # S411B210013

concomitant online resources. All of these originated standards resources were then funneled into OER products for districts across the country. Likewise, different districts and partners have prototyped different aspects of LDC’s iterative student achievement/teacher skill tools and knowledge resources in whichever site — i3 NYC/LAUSD, KY, MS, CO, LA, PA etc. — are funneled through LDC’s double feedback loops to codify, share, and ultimately productize resources for dissemination and replication in districts across the country. Standards architectures, scopes and sequences, curriculum maps, scored student work anchors, disciplinary literacy lessons, and STEM templates are all the culmination of multiple site design and testing, not just one locale. Finally, the LDC CoreTools online platform currently has over 100,000 registered teachers that LDC regularly communicates with through email blasts and platform messaging.

III. Project Design

(1) Conceptual Framework for the Proposed Research and Demonstration Activities (5)

LDC’s logic model during the i3 grant was modified in response to field feedback and student learning data, but at its center always sought to implement Elmore’s Instructional Core and Wiliam’s embedded formative assessment conceptual research through job-embedded PLC professional development and instruction of SCALE-validated, standards-driven performance tasks.²⁰ Schools are the unit of change. LDC’s change theory methodology employs Deming’s systems approach as Tony Bryk incorporated it into education Improvement Science Network theory.²¹ In LDC’s (executed) logic model, inputs include: (1) multiple NGSS, C3, and CCRS SCALE-validated performance writing tasks woven into existing curricula taught throughout the school year as both unit anchor and formative assessment, supported by (2) job-embedded virtual synchronous (Zoom coaching) and asynchronous (CoreTools online course dynamic learning platform) for grade-level disciplinary PLC teachers, overseen by (3) the schools Instructional Leadership Teams which receive parallel LDC virtual synchronous coaching and asynchronous online learning. School ILTs monitor evidence of student mastery (usually writing, socratic seminars, or PBL products) and guide classroom PLC

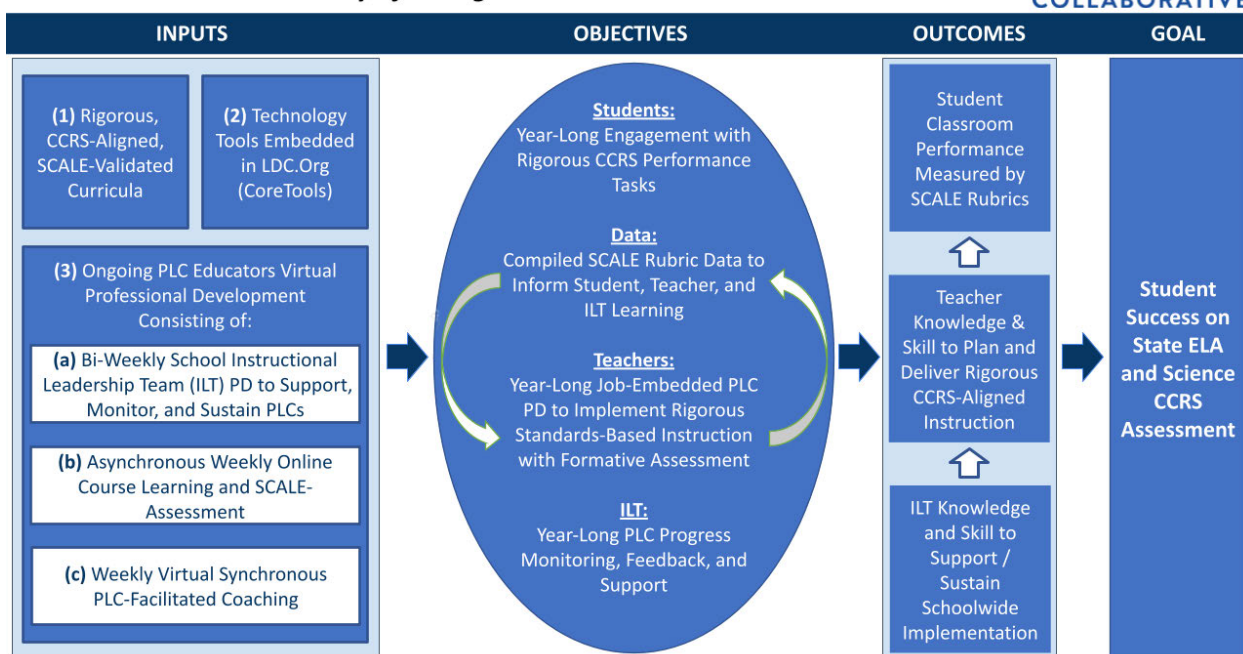
²⁰ SCALE has for decades developed valid, reliable teacher performance assessments such as SCALE’s Performance Assessment for California Teachers (PACT), the teacher licensing assessment for preservice teachers since 2008 and the edTPA, a portfolio assessment that has been used nationally to assess 150,000 teacher candidates since 2013 in several states (NY, WA, TN, MN) for teacher licensure or program accreditation. SCALE also has created both NGSS and CCRS student measurement rubrics and acted as both SBAC advisors and SBAC test item writers.

²¹ <https://www.carnegiefoundation.org/blog/quality-improvement-approaches-the-networked-improvement-model/>
PR/Award # S411B210013

teachers real-time differentiation using SCALE standards rubric scores by grade and discipline. Because student state test assessments are lagging indicators, LDC captures multiple leading formative indicators from online clickstream (course progress and assessments; SCALE-validated badging) and Google Classrooms data (student task engagement, execution, measurement through SCALE-rubric data) corroborating in real time progress of both educator and student standards mastery to inform ongoing iterated and differentiated classroom grouping and instruction.

LDC's Research-Based Theory of Change

LITERACY DESIGN
COLLABORATIVE



(2) Specified and Measurable Goals, Objectives, and Outcomes (5 points)

Measurable Goals	Measurable Objectives	Measurable Outcomes
<p>Increase in Student Learning</p> <p>Measure: Statistically significant increases in State ELA Assessment Scores</p>	<p>Instruction of SCALE-validated Performance Writing Task Anchors</p> <p>Measure: 95% of teachers instruct at least 2 performance tasks per discipline (Sci, SS, ELA) as confirmed by CoreTools Clickstream Data Tracking</p>	<p>Student Formative Assessment data on Standards-validated Performance Writing Tasks</p> <p>Measure: Compiled SCALE student writing rubric data (by trained scorers) to inform student, teacher, and ILT Learning and instructional differentiation</p>

<p>Increase in Teacher Skill:</p> <p>Measure: at least 80% of PLC teachers receive either SCALE juried micro-credential badges or multiple online course assessment certificates</p>	<p>PLC teachers Job Embedded Yearlong Online Learning, Task Instruction, and Student Work Analysis</p> <p>Measures: Platform Course Data Dashboard Tracking and PLC attendance (>80%)</p>	<p>Increased PLC Teacher Knowledge & Skill to Plan and Deliver CCRS-aligned Instruction</p> <p>Measure: Platform assessments and SCALE-juried teacher course instructional artifacts</p>
<p>Increase in ILT Member Skill:</p> <p>Measure: at least 80% of ILT participants receive at least one SCALE juried micro-credential badge</p>	<p>ILT trained to Progress Monitor PLCs and Support Responsive Teaching</p> <p>Measure: ILT Course completions (platform data) and bi-monthly synchronous coaching sessions (attendance data)</p>	<p>Increased ILT Knowledge & Skill to Support Real-time PLC-Iterated CCRS Instruction</p> <p>Measures: Platform ILT Dashboard Tracking (TBD but both clickstream online actions and evidence of skill such as student outcomes)</p>

The table maps 1:1 to LDC’s Logic Model’s inputs, outcomes, activity objectives and ultimate goals: student state assessment success and teacher skill improvement.

(3) Project Design Addresses Target Population Needs (10 points)

LDC’s project design seeks to ensure all teachers — including new and low skilled ones — guarantee effective learning experiences for all students — including high needs students. Obviously, this is a promise often heard before in education.

LDC succeeds by operationalizing the best research to date (Elmore, Darling-Hammond, Wiliam, Hattie, Bryk) in improving students deeper learning — rigorous standards-driven assignments, frequent writing in response to complex text, well-trained teachers (in PLCs), supported by well-trained administrators (in ILTs), with nationally calibrated and objective data of both teacher instructional mastery and student demonstration and progress towards mastering rigorous standards. Effective standards instruction through LDC’s systems approach naturally integrates curriculum, assessment, and educator professional learning to deliver student-centered deeper learning experiences. These three legs of Elmore’s Instructional Core stool are able to work (for once) only because they are informed by SCALE’s inter-rater reliable, and calibrated to national standards, measurement process.²² Each design component of LDC’s model is the product of over a decade of

²² Accurate scoring of both student and teacher competencies springs from originally manual calibration rater-PR/Award # S411B210013

field-based innovation and testing using IDEO user-centered design processes and agile development two week sprint cycles borrowed from the software industry but used both for online navigation and instructional content and data tracking. Historically, for profit EdTechs use teachers primarily for designing the technology experience (this button here? what color? arrow or highlight?). By contrast, LDC incorporated rockstar educators into Sprint Cycle 1 (Sept. 2013) to provide feedback primarily on the instructional learning content as unfolded and supported in user tech navigation. (Today, LDC is in its 138th sprint cycle).

LDC's virtual online learning platform was consecrated by the Carnegie Foundation for the Advancement of Teaching as a national model for student achievement success. Spotlighting LDC's use of continuous improvement principles at its National Press Club convening November 2019, and again at the Foundation's 2,000-strong educator Virtual Summit the following April 2020:

LDC is spotlighted for its use of disciplined inquiry processes to test and refine the core elements of their program design. This approach allows it to leverage its digital delivery platform to rapidly test user-centered prototypes for program design and implementation guided by evidence of the relative impact of these approaches on student learning. LDC's digital, analytic infrastructure enabled it to transform from a face-to-face professional development program focused on individual teachers to a strategic, tech-enabled systems approach for school and district leaders to use in their efforts to diagnose and strengthen literacy practices across instructional systems.²³

For similar reasons, **the USDOE selected LDC** in summer 2019 to present to ten years of i3 and EIR grantees at its annual summer conference on effective user-centered design, rapid prototyping of

Key Components of the LDC Model

ILT Virtually-Trained Coaching of teacher PLCs to adjust teacher instruction to move all students to mastery.	Virtual professional learning focused on what standards mean and what mastery looks like.	Externally validated online performance tasks to measure student growth towards mastery.
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All three focused on measuring students' ability to engage with and demonstrate mastery of discipline-specific complex texts.

technology and instructional practice, followed up by an all-day workshop for nearly 100 grantees. Accordingly, for each of LDC's key systems components, a host of subsystems and processes designed through LDC's

reliability processes designed in collaboration with SCALE, Measured Progress, MetaMetrics, and UC Berkeley (former International Reading Assoc Pres. David Pearson) now automated online in LDC's platform.

²³<https://www.carnegiefoundation.org/engage-with-us/spotlight-on-quality-in-continuous-improvement/literacy-design-collaborative/>.

user-centered design and continuous improvement user cycles have generated the statistically significant outcomes seen in Los Angeles and New York and will continue to be improved as platform data and teacher feedback from multiple districts directs. Currently across the three primary work strands, each component has the following school process expectations — schools are the unit of change — with grade level teams (teachers from each of science, social studies, and ELA) supported initially by virtual LDC coaching and asynchronous platform courses but transitioned to ILT teams who are co-learning during the first year of implementation.

<p>ILT Virtual Training</p> <p>(synchronous & asynchronous)</p>	<p>ILT uses LDC’s online platform courses to deepen knowledge of effective monitoring and direction of teachers’ standards instruction (weekly)</p> <p>PLC teachers calibrated against SCALE student rubric early in the school year via LDC’s online rubric-scoring course. ILT analyzes schoolwide SCALE-rubric data of student performance compiled across classrooms and disciplines (twice a month)</p> <p>Based on student work data analysis, virtually-coached ILT works with each PLC to provide guidance to (1) differentiate student grouping and instruction, (2) review and modify future instruction, and (3) identify school patterns and individual teacher PD needs for targeted PD (weekly)</p>
<p>PLC Virtual Training</p> <p>(synchronous & asynchronous)</p>	<p>PLC (including science, social studies, and ELA grade level teachers) learn collaboratively through LDC’s online platform courses to instruct college ready standards effectively in their classrooms in real time (weekly)</p> <p>PLC teachers calibrated against SCALE student rubric early in the school year via LDC’s online rubric-scoring course. PLC analyzes their students SCALE-rubric data from classroom-instructed performance tasks (at least every other week)</p> <p>Based on student work data analysis, PLC and individual teachers decide how to (1) differentiate student grouping and instruction, (2) review and modify future instruction, and (3) identify patterns in their classrooms and individual teacher areas for growth and improvement, accessing additional LDC platform asynchronous learning modules (weekly)</p>
<p>SCALE-validated performance tasks in science, social studies, and</p>	<p>Pre-implementation (January to June 30, 2022) school-level curriculum audit to identify current curricula and existing texts for embedding LDC SCALE-validated performance tasks. LDC performance task design where gaps exist (e.g. where LDC does not already have an existing performance task modifiable to fit school’s existing curricula)</p>

ELA	<p>4-6 science, social studies, and ELA SCALE-validated performance tasks scheduled across year strategically to assess student progress against standards (minimum two instructed per teacher)</p> <p>GoogleClassroom or manual deployment of science, social studies, and ELA performance tasks during the school year (minimum 2 per discipline)</p>
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LDC is designed to address the needs of all teachers and all students. But it was created from the outset by practitioners, researchers, and measurement experts to address both important absolute and invitational priorities of this grant focused on high needs students and inequitable distribution of effective teachers and teaching.

SCALE’s validation of LDC performance task anchors is half the prompt and half the scaffolded instruction. LDC anchors are taught prompts — i.e. not just handed to students. Instead, the instructional design requires explicit articulation of skill, subskill matched to associated individual lessons. [REDACTED], one of the two founders of Understanding by Design’s backwards design principles, cites LDC in every conference presentation (and his books) for LDC’s expert expression of UbD in our performance task anchor design. Half of the SCALE curriculum rubric assesses the backwards design instructional ladder. This UbD idea of explicitly teaching the skills students need to scaffold to write the rhetorical analysis essay or secondary historical source argument has been critical to LDC’s success with struggling students. Even back in 2012, before LDC developed all of today’s OER performance task resources, the first study of LDC’s efficacy showed statistical significance with free lunch and low reading level students.²⁴ However, when LDC launched in 2013, we immediately partnered with former International Reading Association president [REDACTED] and his team at Berkeley to build out a large bank of individual literacy lessons in science, social studies, and ELA that included special education (universal design) and English language learner extensions as well. These lessons populate the instructional ladder to address the skills and subskills students need to complete the larger performance task demonstration.

Similarly, LDC’s online PD instructional cycles for PLC learning are addressed to meet the

²⁴ Herman, J., Epstein, S., Leon, S., La Torre Matrundola, D., Reber, S., & Choi, K. (2015). Implementation and effects of LDC and MDC in Kentucky districts (CRESST Policy Brief No. 13). Herman, J. and Epstein, F. “Supporting Middle School Content Teachers Transition to the Common Core: The Implementation and Effects of LDC” CRESST. 2014.

needs of all teachers including those new to the profession. Online course content fit into 40 minute periods so that PLC teachers can learn together and to avoid teachers doing the work alone after work or on weekends. LDC's review of clickstream data and teacher and administrator feedback during the i3 grant, however, indicated that for the least skilled teachers, entry into online learning could still be daunting. The weekly and yearlong length and expectation that some teachers would struggle to change their classroom practice but learn in the process to instruct rigorous assignments (rather than activity worksheets or textbook assignments) can sometimes discourage novice and under-skilled teachers. Accordingly, more recently, LDC has targeted these teachers specifically with shorter "micro-courses" of 15-30 minutes in length to more quickly trigger less intrepid teachers' intrinsic motivation through "aha moments" of students engaged in rigorous classroom work beyond teacher expectations. Grant funds would support additional micro courses (such as planned micro courses in universal design task extensions and weaving social and emotional learning into instructional ladder literacy tasks). In this way, LDC can accelerate the learning curve for both low skilled and novice teachers to scaffold their instruction effectively to support even their highest needs students.

Finally, LDC's model requires that SCALE-validated performance tasks be embedded in a school's existing curriculum. To expedite that process, LDC has built out a large performance task bank (with backwards design instructional ladders) incorporating frequently used science, social studies, and ELA texts. In addition, to assist the school thinking process for usage of these SCALE-validated performance writing tasks, LDC has pro forma examples both of yearlong curriculum maps (e.g. social studies both chronologically and thematically) as well as disciplinary product progressions organizing standards pairings horizontally strategically across the course of the year. For example, below is a 7th grade social studies map followed by a pro forma disciplinary student product map with horizontally-spiraled standards pairings:

	Q1	Q2	Q3	Q4
Theme	Connections (Context)	Comparisons	Perspectives	Evaluations
Goal Standard	R2			
Common Focus Standard	R3	R7 ¹	R6	R8
ELA/Literature				
Disciplinary Focus	Analyze Development and Interaction of Characters and Story Elements	Analyze How Textual Elements Produce Meaning or Effect (with comparison across texts in some grade levels)	Analyze Point of View or Purpose	Evaluate Arguments
ELA Product	Literary Analysis	Comparative Rhetorical Analysis	Literary or Rhetorical Analysis	Evaluation
Text Type	Literature	Literature or Literary Non-Fiction	Literature or Literary Non-Fiction	Literary Non-Fiction
Writing Mode/ Standard	I/E	I/E	Arg	Arg
Science				
Disciplinary Focus	Plan and Conduct Observations or Experiments	Interpret and Integrate Diverse Media to Research a Topic	n/a	Evaluate the Argument in a Scientific Text
Science Content Focus Standard				
Science Product	Lab Report	Poster Presentation or Infographic	None	Scientific Report
Text Type	Data from Observations or Experiments, Informational Text	Texts of Diverse Media and Format, e.g., Charts, Graphs, Images, Maps, Models	n/a	Scientific Arguments, e.g., Predictions, Proposals, Engineering Designs, etc.
Writing Mode	I/E	Arg	n/a	I/E
Social Studies				
Disciplinary Focus	Causation	Interpret and Integrate Diverse Media to Research a Topic	Analyze Point of View/Perspective in Sources	n/a
Social Studies Content Focus Standard				
Social Studies Product	Causal Analysis	Multimedia Research Report	Primary/Secondary Source Analysis	None
Text Type	Primary and Secondary Sources	Maps, Photos, Timelines, Political Cartoons, Informational Text	Primary and/or Secondary Sources	n/a
Writing Mode	Arg	IE	IE	n/a

SOCIAL STUDIES: MS	Q1/UNIT 1	Q1/UNIT 2	Q2/UNIT 1	Q2/UNIT 2	Q3/UNIT 1	Q3/UNIT 2	Q4/UNIT 1	Q4/UNIT 2
CONTENT	The New World 1492–1732	Colonization 1690–1771	The Revolutionary Era 1754–1774	A Nation Is Formed 1774–1783	The New Republic 1783–1835	Exploration and Expansion 1805–1850	The Rise of Industrialization 1807–1850	Immigration and Reform 1825–1850
KEY TOPICS & IDEAS	The New World "Following the light of the sun, we left the Old World." C. Columbus	A new society "A voyage to plant the First Colony." Mayflower Compact	Liberty and freedom "Life, liberty, and the pursuit of happiness." Declaration of Independence	The role of government "E Pluribus Unum" Seal of the United States	Challenges of a republic "A Republic, if you can keep it." B. Franklin	The impact on the environment and cultures "We left the banks of the St. Charles...into the unknown civilization." Lewis and Clark	Man vs. Machine "A people...who are possessed of the spirit of commerce, who see and who will pursue their advantages may achieve almost anything." G. Washington	A changing nation "Give me your tired, your poor, your huddled masses yearning to breathe free." E. Lazarus
LITERACY FOCUS	RHSS1, W2, L1-2	RHSS4, W2, L1-2	RHSS2, W1, L1-2	RHSS2, W1, L1-2	RHSS6, W2, L1-2	RHSS7, W1, L1-2	RHSS2, W2, L1-2	RHSS10, W1, L1-2
TEXTS	Maps and Research Sources	Research Sources	The Declaration of Independence	Lyrics to Hamilton, the Play	Excerpts from Federalist Papers	Maps and texts of Lewis and Clark Expedition	Primary and Secondary sources	Primary and Secondary Sources
MODULE	Regions and Cultures of the New World during and after Colonization	The Salem Witch Trials: Taking a Closer Look	Seminal Documents of the United States: The Declaration of Independence	The World Turned Upside Down	Power and Authority: Federalism Then and Now	Manifest Destiny and Westward Expansion	Economic Systems: A Comparison of Native American and European Systems	Coming to America: Voices from America's Immigrants
MINI-TASK FOCUS	R1, R4	RI1, R4	R1, R4	R1, R4	R4	R4	R4	R1
PBL EXTENSIONS	Design an illustrated map of the New World	Simulate a colony to include its institutions	Design a first American flag	Write a preamble to a class constitution	Examine data on voting trends then and now	Produce a play with monologues from various viewpoints	View and discuss Modern Times (C. Chaplin)	Take the Citizenship Exam

LDC's research-validated model already has demonstrated success in reducing achievement and attainment gaps for minorities, girls, low income, English Learner (EL), and special education (Sped)

populations in New York and LAUSD. The model has also been confirmed to close sub-population STEM gaps in the rural and exurban areas of Kentucky and Mississippi.

D. Management Plan and Resource Adequacy (20 points)

(1) Applicant Capacity (personnel, financial, management) for National Scale (10)

The organizations participating in this project have successfully managed larger, more complex implementation and research projects. CRESST (UCLA) is an international research organization that has engaged in larger scale research for decades. <https://cresst.org/education/> Likewise, SCALE has conducted research and engaged in practical educational national implementations including teacher certification performance task tests in more than 10 states, and advised SBAC and provided SBAC items. <https://scale.stanford.edu/>. LDC has also overseen comparable projects (in partnership with SCALE and CRESST) for over eight years. As noted above, LDC implemented its USDOE i3 \$13.2 million, five-year (2015-2020) USDOE Investing in Innovation Validation (mid-phase) grant with 100+ schools in the complex environments of the two biggest districts in the country (NYC and LAUSD). At the same time, LDC spun off from the [REDACTED] Foundation with a \$15m grant to implement the Foundation's primary Common Core strategy by launching the CoreTools Edtech platform in 2014 that has now garnered over 100,000 educator users in all 50 states and nearly 4000 school districts as well as partnerships with the Kentucky and Louisiana state education departments. Personnel roles and responsibilities with decades of management and educational experience include:

Grant Project Director [REDACTED] LDC Executive Director	[REDACTED] spun LDC off from the Gates Foundation in 2013 and oversaw LDC's USDOE i3 grant for the past 5+ years. Prior to that he oversaw 75 NYC schools (outsourced by Chancellor [REDACTED]) as VP for non-profit New Visions for Public Schools. The New Visions work with 75 public school principals included launching one of the first online instructional knowledge sharing platforms in the country, preliminary national CloudLab work, and Bryk's first Carnegie Foundation Improvement Network pilot on teacher development. Before New Visions, [REDACTED] oversaw \$35m in K-12 contract implementations across the country as VP for Princeton Review, and prior to that a \$25m budget and over 150 staff as a senior cabinet member for 3 NYC Chancellors. [REDACTED] is trained by IHI in Continuous
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	Improvement, IDEO in Design, holds degrees from Wharton and UPenn Law, and completed AbD in Educational Leadership in NYU's doctoral program.
LDC Chief Academic Officer Dr. [REDACTED]	<p>Dr. [REDACTED] is a literacy expert for K-12 schools, educational foundations, and private corporations for over a decade teaching the explicit and implicit features of discipline-specific writing to understand the metacognitive connection between the thinking in a discipline and the writing of that discipline. A university lecturer, Dr. [REDACTED] worked with educators to implement meaningful gamification and simulation pedagogy to reduce the detachment between theory and practice in the classroom. Dr. [REDACTED] is also involved in extensive research on writing transfer from secondary to post-secondary education and has been published in journals such as <i>Composition Studies</i>, <i>Writing Across the Curriculum</i>, and the <i>Journal of College Writing</i>. She earned her Ph.D. in rhetoric and composition from the University of Louisville, where she was the recipient of the Barbara Plattus Award for Excellence in Teaching.</p>
Chief Technology Officer [REDACTED]	<p>A veteran of the private sector, [REDACTED] has led LDC's strategic technical leadership: developer-teacher interplay, agile development sprint cycles, online data collection, clickstream analysis, CoreTools platform, etc. Prior to LDC, [REDACTED] provided strategic technical direction to increase the impact of the Gates Foundation's \$100m+ education grant portfolio. [REDACTED] has overseen K-12 education venture advisory work resulting in an oversubscribed angel round, developed a tablet manufacturer's K-12 channel distribution strategy, and designed a prize to spur innovative technologies that address learning differences. [REDACTED] has led large information technology organizations and consulted for numerous fortune 500 companies, holding senior-level IT roles in systems integration, supply chain performance efficiencies, and agile development at both Costco and Amazon manufacturing and distribution centers in 15 states and Europe.</p>

Mobility Labs Software Engineers	<p>Mobility Labs partners with domestic and international social impact organizations to build applications, websites, and digital tools, collaborating deeply with clients and stakeholders at each stage of product strategy, design, and development to shape the product vision and implementation to solve real world problems. Mobility Labs was founded by tech entrepreneur [REDACTED] and is an armed services disabled veteran owned Benefit Corporation. [REDACTED] has led a number of large, open source projects with the World Bank, the Gates Foundation, Laura & John Arnold Foundation, Pew Charitable Trust, the World Bank, the Urban Institute, and LDC. [REDACTED] is a founding member of NYCEDU, a NYC initiative to improve education by engaging schools, vendors, and parents in tech design. Prior to founding Mobility Labs, [REDACTED] provided high-tech production engineering for Ford, Chrysler, and GM.</p>
Stanford Center for Assessment Learning and Equity (SCALE) Dr. [REDACTED] Stanford Univ.	<p>Dr. [REDACTED] and SCALE (a) develop innovative performance assessment tasks — “For and As learning” — that measure both students and teachers at the school, district, and state levels. For example, in 2008 SCALE created California’s teacher pre-service licensing assessment (PACT) and more recently, developed the edTPA, a portfolio assessment used nationally for teacher licensure and program accreditation assessing 150,000 teacher candidates (since 2013) in many states (e.g. NY, WA, TN, MN). SCALE has been SBACC advisors for a decade, designing specifications and student performance task items for the Smarter Balanced national assessment system. Prior to launching SCALE, Dr. [REDACTED] held a variety of leadership roles in the Connecticut State Dept. of Ed. (incl. Chief of Curriculum, Research and Assessment); was the co-director of the first Assessment Development Lab for the National Board for Professional Teaching Standards (NBTS), and at Columbia University managed the redesign of the New York State Regents.</p>

Evaluator CRESST- UCLA	Dr. [REDACTED] (PI) will lead the proposed evaluation study and provide intellectual and methodological leadership and overall direction. Dr. [REDACTED], is a senior research scientist at UCLA CRESST. With over a decade of experience in educational evaluation, she specializes in research design and methodology and has led multiple statewide and national evaluation projects and evaluation projects that involve multiple school districts. Dr. [REDACTED] will have day-to-day responsibility for project operations, including evaluation design, data collection and analysis, reporting and monitoring and assuring the quality, timeliness, and cost effectiveness of project operation and will supervise, review, monitor, train, and direct all project staff/ personnel. The UCLA CRESST working teams will hold weekly project meetings to monitor project progress and productivity, to immediately solve problems as they may emerge, and ensure the adherence to the schedules and deadlines. CRESST will also meet monthly with the LDC team, for status update, problem solving, project timeline/deadline, and strategy planning, etc.
Partner Network	List of Partner Organizations (for dissemination, scaling) on our website https://ldc.org/about-us/our-partners https://docs.google.com/presentation/d/1cMHYu_iHWvDdP7SO8prBCD5eG0d2bgURkABt5bBFXdA/edit#slide=id.g3856c62423_0_0

Finally, in terms of financial resources and private match, LDC can self-fund the first year match if need be (current bank statement provided) and in the past the private match funding for our original USDOE i3 grant was provided by both the Gates Foundation and Carnegie Corporation.

(2) Management Plan: Defined Responsibilities, Timelines, Milestones, and Budget (5)

LDC's project team, as with the comparably sized i3 mid-phase grant, leads and manages all workstreams coordinating CRESST evaluation activities, SCALE technical assistance (student scoring and validating disciplinary performance tasks for school curricula gaps), and software development. LDC timely met each and every milestone and timeline in our \$13.2m USDOE i3 grant. Responsibility for each work stream and timeframe for deliverable are as follows:

January 1, 2022 to August 1, 2022	Responsible Organization: LDC
District and School	- Treatment Sample: district and school recruitment (min. 35

Recruitment	each CA/KY treatment schools) and comparison non-treatment schools (additional min. 70) - Execution of school MOUs; District agreements
Technology Development	Integrate ILT manual processes into CoreTools platform
	Improve design of student data capture and representation Beta design and release of ILT clickstream data reports
	CoreTools API Improvement (for Google Classroom integration)
Implementation	Platform introduction (district, schools)
	ILT induction (Spring Orientation/Summer commencement)
Curriculum Review	Curriculum Audit school-by-school. Horizontal and disciplinary standards architectures signed off by school.
Responsible Organization: CRESST-UCLA	
Evaluation	CRESST-District IRBs (into Fall 2022) Finalization of teacher, administrator, and student surveys
Responsible Organizations: LDC and SCALE	
Content Development	Curriculum fulfillment: LDC creation and SCALE jurying of additional performance tasks to fill curricula gaps in science, social studies, and ELA identified by school in curriculum audit above (rolling throughout grant).
August 1, 2022 - June 30, 2023 (Year 2)	
Responsible Organization: LDC	
Implementation	PLC weekly virtual synchronous and asynchronous online PD and Zoom coaching (of lesson study implementation and student work analysis)
	ILT weekly asynchronous PD and bi-monthly LDC-facilitated progress monitoring and instructional differentiation decisions based on compiled student and schoolwide SCALE rubric data
	SCALE student rubric scoring calibration training: ILT/PLC
	Students engage with student-centered performance tasks 4-6 times (min. 2) per year in science, social studies, and ELA
	Schools for Scale and Field Testing: recruit districts and 100+ additional schools LDC field innovation and testing of instructional improvement products and processes as well as preliminary national scaling (not CRESST-evaluated) (may have

	to be Years 2 and 3)
Technology	Agile Development: Ongoing 2-week sprint cycle improvements to existing CoreTools functionality and testing and improvement of new student data and ILT progress monitoring functionality
Content Development	Rolling creation of new SCALE-validated performance tasks for embedding in science, social studies, and ELA middle school curricula
National Scale Efforts	Rolling recruitment (into Year 3) of 100+ non-evaluation schools (i.e. no CRESST data collection or evaluation but LDC platform usage and school progress data) in California, New York, and Florida (rural, exurban, urban) to implement LDC's scalable virtual model to test rapid scaling
Responsible Organization: CRESST-UCLA	
Evaluation	<ul style="list-style-type: none"> - Baseline student, teacher, school performance data collected - Baseline administrative data (student demographics, teacher years of service, etc.) - End of year survey administration (students, teachers, admin)
July 1, 2023 - June 30, 2024 (Year 3)	Responsible Organization: LDC and CRESST-UCLA
	Same as Year 2
July 1, 2024 - June 30, 2025 (Year 4)	Responsible Organization: CRESST-UCLA
Evaluation	CRESST completes lagging student state test assessment analysis and issues report
Responsible Organizations: LDC and SCALE	
National Scale Efforts	Rolling recruitment (starting Years 2/3) of 100+ non-evaluation schools (i.e. no CRESST evaluation but LDC platform usage and school progress data) in California, New York, and Florida (rural, exurban, urban) to implement LDC's scalable virtual model to test rapid scaling. SCALE continuing technical assistance on rubric scoring and performance task validation fulfillment.

(3) Reasonable Costs in relation to objectives, design, and project significance

LDC's cost projections are based on the actual cost experience of providing nearly identical services for the past five years in 100+ schools in NYC and LAUSD as well as districts in Kentucky, Pennsylvania, Louisiana, Mississippi, etc. Costs should decrease during the course of the grant as LDC further automates work strands such as ILT support and student data collection

as well as transitions to school ILT ownership of all ongoing synchronous and asynchronous training. Cost estimates premised on CRESST's evaluation power requirements: minimum 35 California schools and 35 Kentucky schools which will implement LDC's Enacted Curricula systems model. An additional 70 control schools (no LDC treatment inputs) identified as well. In addition, beginning in Year 2 and at least by Year 3, LDC will identify another 100+ middle schools for implementation of LDC's systems model: (1) PLC yearlong lesson study PD, (2) instructing rigorous, engaging student centered SCALE-validated performance tasks in science, social studies, and ELA, (3) monitored by their synchronously and asynchronously trained school ILTs. Estimating the number of students and teachers per school results in the following cost estimates:

Middle School (grades 6-8), 3 teachers per grade/per discipline (Sci, SS, ELA) (est. 27 teachers)
 Non-evaluation 100+ middle schools: 2 teachers per grade/discipline (est. 18 teachers)
 60 middle school students (2 sections) per teacher

Grant Year	Annual Cost (proj)	Schools	Teachers	Students (min.)	Cost Per Student
Year 1	\$2.43m	Pre-Implementation Recruitment Tech Build Content Creation Evaluator (10%)		***	
Year 2	\$2.85m	70 treatment schools Technology Development Content Creation Evaluator (10%)	1890	113,400	
Year 3	\$2.16m	70 treatment schools Technology Development Content Creation Evaluator (10%)	1890	113,400	
Year 4	\$1.01m	Technology Development Content Creation Evaluator (10%)			
		70 control schools (Year 4) ²⁵	1260	75,600	
Total Across Grant Term (includes Evaluation costs)				302,400	\$26

²⁵ LDC and CRESST's plan to obtain district agreement to an RCT study includes offering the 70 school control group that received no services free LDC-provided PD, performance task anchors, etc. in Year 4 as if they were treatment schools.

As demonstrated in the above table, per pupil cost estimates over the course of the grant would be approximately \$26 per student. Even if none of the control group schools chose LDC services in Year 4, the total estimated per pupil cost is an inexpensive \$35. Given annual per pupil expenditure by school districts averages \$8000-\$28,000 per student these estimated costs are quite efficient given the doubling of student learning LDC seeks to scale.

E. Quality of the Project Evaluation (up to 25 points).

CRESST will conduct parallel randomized control trials (RCT) studies of LDC implementation and effects in two settings: rural Kentucky schools and in California metropolitan schools. Each study will have 35 treatment schools and 35 control schools. The California study replicates and expands the Wang, et al. (2020) study by scaling up the analytical sample for the schools/teachers/students, and the Kentucky study replicates and expands the Herman, et al. (2015) study by scaling up to all three middle school grades. Both studies also expand to include science outcomes. The proposed RCT studies will be implemented in new schools in California and Kentucky with overlapping samples and settings, and are designed to meet the WWC standards without reservation. These two comprehensive, mixed-method evaluation studies will address the following six questions:

- 1. (Main Impact)** What is the LDC effect on students' science and ELA state assessments?
- 2. (Fidelity of Intervention)** What and how do teachers implement LDC in their classrooms? What is the level of fidelity of implementation at the teacher level by subject and across subjects? What is the level of fidelity of implementation at the school level?
- 3. (Implementation and Impact)** What is the relationship between fidelity of intervention variables and student outcomes?
- 4. (Moderator/Subgroup)** Does the LDC intervention effect on students' ELA and science performance on state assessments vary by student's prior achievement on standardized tests and family socio-economic status (SES) as measured by free- and reduced fee meals status?
- 5. (Mediators and Impact)** How do teacher commitment and skills in planning and delivering standards-based instruction and years of service mediate the LDC effect on student outcomes?

6. (Replication/Scale) What are the conditions/contexts in which the LDC is most effective?

E1. What Works Clearinghouse Evidence Standards: The two parallel studies will enable CRESST to understand the LDC effect in the replication and scale stage and accommodate the two different assessment systems adopted by California and Kentucky. Both studies use a blocked cluster-randomized trial, where participating schools are blocked on district, school grade level span (K-8, 6-8, 6-12, and K-12), school race/ethnicity, and school poverty level as measured by percent of students qualified for free or reduced-fee lunch. Randomization will be conducted within each school district. At the time of the writing, Los Angeles Unified School District (LAUSD) in California and seven rural school districts in Kentucky are committed to participating in the studies and understand the requirement of school random assignment. Both RCT studies, when well implemented, are expected to produce strong evidence of LDC impact meeting WWC standards without reservations.

LDC with CRESST support will work with each district leadership team to finalize the school recruitment and assignment within the first eight months of grant funding. The treatment schools will receive LDC professional development training in 2022-23 and the control schools /teachers will implement alternative standards-driven programs designated by the district, or “business as usual” (2022-23 and 2023-24). CRESST will guard against potential contamination between treatment and control groups by excluding from our analytical samples the students and teachers who move between treatment and control schools.

The treatment teacher pool consists of those who teach Grades 6-8 ELA, social studies, and science and who receive the LDC professional development training in 2022-23. The treatment teachers will implement the LDC intervention in their classrooms in the 2023-24 school year. The students taught by the treatment teachers in 2023-24 are the treatment students. To limit the risk of bias associated with joiners, CRESST’s studies will include in the final analytical sample students who are at the treatment and control schools for both 2022-23 and 2023-24 school years. By this, we will allow for early joiners who joined the treatment schools in the school year 2022-23 and exclude later joiners who joined the schools in the outcome year of 2023-24.

Power Analysis. To estimate statistical power, CRESST will use Optimal Design software

(Spybrook, et al, 2011), which implements procedures described by Murray (1998) and Raudenbush (1997) for a cluster randomized trial with person-level outcomes at level 1, teachers at level 2, and the treatment assignment at level 3. We have the students nested in teachers, teachers nested in schools, and schools as the unit of assignment to treatment/control.

Prior research was used to identify the parameters used for the power analysis. Zhu et al. (2012) reported about 7–17% of the total variation in student test scores was between schools, and 20–38% was between classrooms/teachers within schools. Past research also suggests that school-level aggregated pre-test scores can account for 50–80% of the between school variance (Bloom et al., 2007, Hedges & Hedberg, 2007). Therefore, our power analysis assumes a moderate effect size of 0.20, a Type I error rate of 0.05, an intraclass correlation of 0.07 at school level, an intraclass correlation of 0.2 at the teacher level (Agodini et al, 2003; Bryk & Driscoll, 1988), and school-level covariates including aggregated pre-test scores explaining 50% of the variation in student achievement. The analysis indicates that a sample of 27 treatment schools and 27 comparison schools with 20 students per unique teacher team would provide a 0.80 probability of finding a statistically significant difference, if there are 8 unique teams per school.

While LDC and CRESST intend to retain all recruited schools, we understand there is likely to be some school level attrition. To account for possible attrition, and after observing a 25% school attrition rate in our prior study, we plan to recruit 30% more schools than our power analysis indicates, for a total of 35 treatment and 35 control schools in each study location.

Analysis Approach. The study will gather a range of data sources—including program data, district data, and survey data, employ multiple analytic procedures and both quantitative and qualitative methodologies to address the proposed study questions. The main student outcomes are their science and ELA performance on state assessments. The implementation indicators are created based on program data and CRESST survey as described in **Section E3**.

The analysis of LDC impact (**study question 1**) will be estimated using an extension of the standard multilevel modeling framework known as multiple membership multiple classification (Browne et al., 2001), as used in the prior LDC studies (Wang, et al., 2020; WWC, 2021). These models can account for complex classification structures in which students are nested within schools

but are also members of multiple classes led by different teachers who may or may not be implementing LDC. MMMC has the flexibility to account for this type of complex nesting structure in which students are hierarchically nested under schools but have one-to-many relationships with teachers. This is especially true for middle grade students being exposed to multiple core subject teachers and courses each semester.

As recommended by Browne et al. (2001), CRESST will employ Bayesian methods using Monte Carlo Markov chain (MCMC) techniques to account for the non-independence of observations within clusters. The multilevel models will incorporate baseline demographic and achievement variables as covariates. We also plan to model the treatment intervention variable as a fixed effect in two ways. The dosage-dependent model takes into account the students' level of exposure to LDC teachers. The dosage independent model classifies any student exposed to a LDC teacher as a treated individual, regardless of dosage (≥ 1 teacher).

To answer the implementation **Study Question 2**, CRESST will create indicators of each LDC implementation component, as described in **Section E3**, and analyze them descriptively and in comparison to implementation benchmarks at the school and teacher levels. Analyses also will explore where implementation variation occurs (e.g. whether across grades, subject areas, or schools).

For the implementation and impact study (**Study Question 3**), we will conduct additional 2-level MMMC analysis to generate school-level residual files that include the school-specific LDC effect. Then we will conduct exploratory inferential and descriptive analyses to examine the relationship between fidelity variables and student outcomes in the form of school-level LDC effects. Successful schools will be identified to produce visual pictures of these schools on the various fidelity measures for consideration of future replication (**Study Question 6**).

For **study question 4**, we will use our multilevel model to understand the role our student-level moderators—prior year achievement and family SES—play in our study of LDC impact by including interaction terms between them and the intervention in the analysis model. The additional LDC-SES interaction variable will indicate whether the LDC intervention is equally effective for students regardless of SES levels or the intervention is more effective for certain groups when the associated

interaction coefficient is statistically significant. The additional LDC-prior achievement interaction variable will demonstrate similar information regarding LDC effect by prior achievement levels.

To assess whether teacher skill and commitment in implementing LDC instruction and years of service (described in Section E3) mediate the LDC effect on student outcomes (**study question 5**), we will use structural equation modeling (SEM) to generate the estimation of latent variables and their relations (Bentler & Weeks, 1980). SEM allows for the exploration of the direct effects of LDC intervention on the mediators themselves. By that, the SEM model will explore whether teacher skill and commitment in implementing LDC instruction and years of service are associated with student outcomes. We will analyze both the complete mediation model and the partial mediation model, following the recommendations by Agodini et al. (2010). Bootstrapping resampling procedures will be used to adjust the standard errors and confidence intervals for the direct and indirect effects.

E2. Evaluation to Provide Guidance About Strategies for Replication

The evaluators will build on a history of prior experience to generate additional guidance on how to further strengthen the program and to promote successful replication by conducting the following analyses, in addition to the main analysis.

LDC Effect and Student Exposure. As described above, our impact analysis will not only generate the main LDC effect in a dosage-independent model, but also model students' level of exposure to the intervention teachers in a dosage-dependent model, as we did with the i3 grant. This will provide insights on the relationship between the LDC effect and student level of exposure to guide future program implementation.

LDC Effect and Moderators/Subgroups. Our analysis investigating whether LDC effects vary by student's prior achievement and free/reduced lunch status as well as by other student demographics (e.g. gender, race/ethnicity, EL status, and school demographics (e.g. school grade level span, % minority, % ELs, % free/reduced lunch), whenever sample size allows, will help to clarify for what sample and setting the intervention is most effective.

LDC Effect and Mediators. Our analyses of how teacher commitment and skills in planning and delivering standards-based instruction may mediate the LDC effect on student outcomes will not only help to identify contexts where LDC is likely to be most successful but also may have

implications for program planning.

LDC Effect and Fidelity of Intervention. The analysis will examine the relationship between fidelity variables and student outcomes in the form of school-level LDC effects; LDC uses clickstream CoreTools and Google Classroom analytics to monitor school progress. These monitoring data allow the ILT and/or LDC to intervene early to ensure schools are on course to treatment implementation, and to provide additional support or problem solving of a concern/issue.

E3. Key Project Components, Mediators, Outcomes, and Implementation Threshold

The evaluation will monitor the fidelity of the intervention against the LDC Theory of Change using multiple measures via LDC program data and CRESST surveys at both the teacher and school levels. LDC program data will take a number of forms, including (1) attendance data capturing engagement of teachers and the ILT in the LDC PLC, including both the length and frequency of the PLC, and the PLC agenda; (2) back-end data from LDC CoreTools capturing how teachers and ILT progress on their course materials, use of LDC tools, use of online courses to guide professional learning, and analysis of student work; (3) back-end data from LDC CoreTools tracking teacher skill development on the 20 LDC instructional teacher competencies; and (4) automated program data on how many LDC tasks are used across teachers and schools.

Online CRESST surveys will be used to collect fidelity data from PLC teachers and ILT members including school administrators to examine commitment towards LDC, skill in implementing LDC instruction, perceptions of LDC usability, PLC support, ILT and school support, and program impact on student learning. Questions on optimal replication will also be asked.

Measuring Key Project Components. The following lists the key project inputs and components, along with the proposed implementation thresholds based on the results from the earlier studies as well as LDC program expectations. Each component has multiple measures.

- **Rigorous CCRS-Aligned Curriculum**, as documented in LDC.org program data, the threshold is for teachers to adopt and implement minimally two SCALE-validated modules in their subject area instruction over the course of the school year.

- **Technology Tools**, as documented by CoreTools on ILT and teachers' interaction and use of the tools on a weekly basis (70% of the weeks when schools are open).

- **ILT Development**, as documented by ILT attendance at training sessions at least twice monthly, attending 70% of the bi-weekly PLCs (lasting 60-90 minutes each), and engagement in CoreTools virtual course materials (70% material). At least one ILT member will be SCALE micro-credentialed, as determined by LDC online program records.

- Asynchronous **Teacher Skill Development**, as documented by teacher engagement with CoreTools and engagement with virtual course materials (70% material), submitting student work analysis after each module cycle (2 modules/cycles); and mastering the 20 LDC competencies.

- Synchronous **PLC with Virtual LDC Coaches**, as documented by LDC coaches using Google Form data on agenda and teacher attendance on these bi-weekly PLC meetings (lasting 45–60 minutes each with teachers expected to attend 70% of the LDC virtual coaching meetings).

Measuring Teacher Outcomes. Teacher skills in implementing standards-driven instruction, teacher commitment towards LDC, and teacher years of service will serve as the mediators of LDC impact on student learning outcomes. Teacher skill measures were described earlier in “**Teacher Skill Development.**” Teacher commitment is measured by their PLC attendance, technology tools use, and their responses on CRESST surveys. Teacher years of service information will be part of the teacher data we request from the school districts.

Measuring Student Outcomes. Scale scores on Smarter Balanced ELA assessments for Grades 6-8 students and California Science Test (CAST) for Grade 8 serve as the primary outcomes for the California study. For Kentucky, primary outcomes are Kentucky Performance Rating for Educational Progress (K-PREP) science, reading, and writing scale scores for Grades 6-8 students.

Year 1 (January 2022 – December 2022)

- Work with LDC and school districts to identify schools and teachers for study participation
- Update evaluation study plan (e.g. study design, sampling, data collection) as needed and submit the revised plan to U.S. Department of Education
- Prepare and submit IRB applications to UCLA and the participating school districts
- With LDC solicit teacher and ILT member consent for study participation (Sept 2022)
- Develop and adapt teacher and ILT member surveys on their program participation, satisfaction, and perception of program effectiveness

Year 2 (January 2023 – December 2023)

- Finish teacher and ILT member recruitment
- Finalize the teacher and ILT member surveys
- Work with LDC to administer the online surveys in Spring 2023
- Conduct survey data analysis
- Analyze 2022-23 teacher implementation data from LDC

- Analyze 2022-23 student & teacher data from the participating school districts

Year 3 (January 2024 – December 2024)

- Conduct and finish analysis of student and teacher data
- Prepare an evaluation report based on 2022-23 data
- Work with LDC to administer the online surveys in Spring 2024
- Conduct survey data analysis
- Collect, score, and analyze the modules developed/used by the participating teachers
- Analyze 2023-24 teacher implementation data from LDC
- Analyze 2023-24 student and teacher data from the participating school districts

Year 4 (January 2025 – December 2025)

- Conduct and finish analysis of student and teacher data
- Prepare an evaluation report based on 2022-23 data
- Prepare the final report and disseminate

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