

**“The National Writing Project:
Leveraging and Sustaining a National Improvement Infrastructure for Professional
Development to Improve Writing Instruction Across Content Areas for *All* Students”**

Project Narrative

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Development to Improve Writing Instruction Across Content Areas for *All* Students**

In this Supporting Effective Educator Development (SEED) proposal, the National Writing Project (NWP) addresses *Absolute Priority 2: Professional Development for Teachers to Improve their Writing Instruction*. NWP also directly addresses *Competitive Preference Priority 1: Supporting Practices and Strategies for which there is Strong Evidence of Effectiveness*; *Competitive Preference Priority 2: Improving Efficiency (Cost-Effectiveness)*; and *Competitive Preference Priority 3: Promoting Science, Technology, Engineering and Mathematics (STEM) Education*. These preferences are referred to in sections A and B of the proposal respectively.

Current education research highlights the pivotal importance of effective teachers in their students' lives (Bill & Melinda Gates Foundation, 2013; Carey, 2004; Ingersoll, 2008; Schacter & Thum, 2004). The NWP has been developing strong, effective teacher-leaders in the teaching of writing since it began in 1974 with 25 teachers at one local site, the Bay Area Writing Project at the University of California, Berkeley. NWP recruits and prepares exemplary teacher-leaders each summer and academic year through an intensive program of leadership development in the teaching of writing across the NWP network of 190 sites, anchored at universities serving all 50 states, Washington, D.C., Puerto Rico, and the U.S. Virgin Islands.

Since its inception, NWP has grown into a national improvement infrastructure to support student writing and learning in classrooms, schools, and districts across the country (St. John & Stokes, 2008). To improve student writing achievement, local NWP sites work with school and district leaders to design programs that provide teachers with training and support in research-based strategies for teaching writing. NWP teacher-leaders provide more than 6,700 professional

development activities annually, reaching 100,000 educators and, through them, 1.4 million students. In 2011-12, NWP programs reached 3,000 school districts.

Many aspects of the Writing Project model are familiar constructs across a range of programs that aim to transform education today (Darling-Hammond, Wei, Andree, Richardson, & Orphanos, 2009), including examining teacher practice closely through public presentations and peer review; using teacher knowledge and expertise in coaching and mentoring of colleagues; building distributed leadership to support school improvement efforts (Spillane, 2006); and providing sustained opportunities for educators to engage in professional learning communities, both face-to-face and, increasingly, online. Further, a growing consensus among researchers suggests that effective professional development incorporates five elements: content focus, active learning, coherence with teachers' knowledge and beliefs as well as the policy environment, sufficient duration, and professional community or collective participation (Borko, 2004; Desimone, 2009). NWP's signature model of professional learning and leadership development embodies these elements.

NWP is the only literacy-focused professional development organization with the capacity to provide high-quality, locally defined and delivered professional development on a national scale. Currently, NWP sites are located within 50 miles of 75% of America's teachers. Scaling up a program model to provide *reach* is a significant challenge in itself. Continuing to provide high-quality programs *at scale* with a depth of implementation requires regular review of program objectives, measurement of program quality, and ongoing research and evaluation studies that address the program design and implementation. As an educational improvement infrastructure, NWP is committed to the ongoing use of evidence to guide program design and implementation (Lieberman, 2006; McDonald, Buchanan, & Sterling, 2004).

In this proposal, we outline NWP’s approach to professional development to improve the teaching of writing across content areas and highlight the strong research evidence that supports this work. We propose a project design and goals that will allow NWP’s network of sites to reach additional teachers and schools serving concentrations of high-need students over the next two years. This proposed two-year project provides teachers with the intensive professional and leadership development necessary for them to support students in reaching rigorous academic standards across content areas. The design builds on NWP’s core model, as well as our latest efforts to create and foster online communities of practice to provide teachers with anywhere, anytime learning opportunities linked to improving student achievement in writing. In order to sustain and innovate at scale, NWP seeks to leverage the power of these online communities of practice while also supporting targeted opportunities for face-to-face professional development.

A. Significance

(1) National Significance

Improving the Teaching of Writing Across Content Areas. Despite the central importance of writing in academic, civic, and professional life outside of school, inside of school writing has long been the neglected “R” (National Commission on Writing, 2003). Applebee’s (1981) seminal study of high-school writing instruction demonstrated that although writing activities, very broadly defined, took place during 44% of class time, only 3% of this time involved students writing at least a paragraph. Most writing activities focused on mechanical, or fill-in-the-blank, uses of writing and note taking. Nearly 30 years later, Applebee and Langer (2011a) conducted a comprehensive study of writing instruction. What they found mirrors what we know from other research on writing: writing has gained ground, but is still not taught or used consistently across disciplines (Graham, et al., 2012; Graham & Perin, 2007).

With the introduction of new college- and-career-ready standards and a shift to an emphasis on deeper learning, a stronger focus on writing instruction is emerging. To some observers, writing is undergoing a “renaissance in curricula” (Gewertz, Nov. 13, 2012, *Education Week*).

As Gewertz notes,

Teachers are focusing on writing instruction like never before. More and more, they're asking students to write about what they read, helping them think through and craft their work, and using such exercises as tools not only to build better writers, but to help students understand what they're studying. The shift is still nascent, but people in the field are taking notice. It marks a departure from recent practice, which often includes little or no explicit writing instruction and only a modest amount of writing, typically in the form of stories, short summaries, or personal reflections, rather than essays or research projects on topics being studied.

This shift is moving effective classroom instruction toward the demanding goals outlined in the Common Core State Standards (CCSS) for English Language Arts (ELA), which include 10 anchor standards devoted to writing and additional writing standards specifically intended for history, science, and technical subjects. Significant academic writing—informative, argumentative, and evidenced-based—is expected across grade levels and content areas. Previous standards-based reform efforts teach us that effective professional development will be key to successful implementation of these still new and far-reaching standards (Cohen, 1990; Resnick, Stein, & Coon, 2008), and key to creating effective literacy instruction across the curriculum.

Prior to the introduction of the CCSS, NWP was already engaged in expanding the notion of discipline-specific writing and reading. From the outset, NWP sites have been cross-curricular K-university communities, and this diversity of disciplinary knowledge has contributed to the development of writing across the curriculum at both the school and university level (Wolfe, 1999). Much of the early work emphasized building opportunities for writing to learn into the science classroom, both to support students in making sense of difficult content, and to provide

teachers with a source of information about students' conceptual understanding—the better to plan instruction that addresses their misconceptions in the STEM classroom. This work included published resources and curricular materials written by NWP science teacher-leaders (Tierney, 1998; Tierney & Dorroh, 2004; Wotring & Tierney, 1981) and writing theorists (Bazerman, 1988) and (Thaiss & Zawacki, 2006).

In 2007, NWP inaugurated **Advancing Literacy**, a 3-year program funded in part by the Carnegie Corporation of New York, which provided a new opportunity to support a strategically designed and intentional program of professional development for content-area teacher-leaders across the country. The program took seriously the need for expert teachers from a range of disciplines to lead professional development opportunities in order to support students in attaining strong academic literacy. The program resulted in new open educational resources (OERs) and professional learning opportunities for Writing Project sites across the country and the schools and districts in their service areas.

The CCSS, *A Framework for K-12 Science Education: Practices, Crosscutting Concepts and Core Ideas* (National Research Council, 2012), and the *Next Generation Science Standards* (2013) herald a significant movement toward integrating science education and literacy learning. Many experimental efforts and associated research studies have shown that there is a symbiotic relationship between science and reading and writing (Bazerman, 1998; Draper, 2008, 2010; Graham & Hebert, 2010; Lee & Spratley, 2010; Moje et. al., 2004; Moje, 2007, 2008; Pearson, Moje & Greenleaf, 2010; Shanahan & Shanahan, 2008). The need to explore this synergy is paramount: in elementary schools—as an unintended consequence of the emphasis on math and reading over the last decade—less and less science is being taught. At the secondary level, the need to help students master discipline-specific literacy demands in science and engineering has

motivated an interest in new science curricula and professional development. As reported in a recent study of science teaching and learning in California, “everyone is under pressure to focus on English language arts and mathematics; this focus limits the amount of time available for science and other subjects in elementary schools” (Dorph et al., 2011). Students arrive in middle school with less science learning than ever before at the exact moment that teachers are being asked to teach science in more sophisticated ways. As *Preparing Teachers* (National Research Council, 2010) noted, “Instruction throughout K-12 education is likely to develop science proficiency if it provides opportunities for a range of scientific activities and scientific thinking, including, but not limited to: inquiry and investigations, collection and analysis of evidence, logical reasoning, and communication and application of information.”

This expansive vision of science education includes--indeed requires--robust literacy practices: practices that include information writing and argument, public engagement activities, and policy debate. In that regard, the new *Framework* is uniquely compatible with the CCSS for writing in science--standards that include a similar broad, yet discipline-specific, view of writing in the science classroom. In states adopting both the CCSS and Next Generation Science Standards, the synergy between robust literacy practices and rigorous science learning is a promising engine for transforming the teaching of science.

NWP supports efforts connected to improving achievement in science. Beginning in 2011, 22 NWP sites have been working on curriculum development that includes writing in the scientific disciplines through a Bill & Melinda Gates Foundation project, the Literacy Design Collaborative (LDC). In 2012, NWP received a grant from the National Science Foundation to work with the Association of Science and Technology Centers (ASTC) (Award Number DRL-1224161) to build local partnerships that create projects at the intersections of science and

literacy. NWP's long-standing history and current efforts position it to make significant contributions to the integration of science, literacy, and digital tools.

Teaching Writing in the Digital Age. Writing *is* digital in the 21st century. Recognizing the significant role of computers in learning, including writing, the new Writing Framework for the 2011 National Assessment of Educational Progress defined the specific knowledge and skills to be addressed in the digital age: "Writing is a complex, multifaceted, and purposeful act of communication that is accomplished in a variety of environments, under various constraints of time, and with a variety of language resources and technological tools" (p. 4).

In the administration of NAEP Writing 2011 (at Grades 8 and 12) students composed their responses at the computer for the first time in this national assessment. Writing 2011 also introduced new scales and achievement levels. Only 24% of students at grades 8 and 12 performed at the proficient level, while just over 50% achieved at the basic level, which indicates partial mastery of fundamental skills (National Center for Education Statistics, 2012). Similarly, specific anchor standards in the CCSS call for students to develop facility with new writing technologies and point to an additional area of needed professional development: teaching writing with digital tools. Digital tools provide a range of robust new affordances to support young people's engagement in writing and creating content for a variety of audiences and purposes. Outside of the school day, students increasingly spend time online and write for their own purposes. However, students often do not make a connection between any writing they choose to do and "school" writing (Lenhart, Arafeh, Smith & Macgill, 2008). Yet the CCSS are clear in their delineation of expected skills in information literacy, digital citizenship, and digital composition. These new demands for teachers mean that even those educators who feel prepared to teach writing in more traditional ways may need professional development support to re-

imagine their practice for the internet age (Purcell et.al, 2012, 2013; National Writing Project, DeVoss, Eidman-Aadahl, & Hicks, 2010).

NWP is broadly recognized in the field as a leader in digital literacy. To support teachers in reimagining their practice, NWP developed **Digital Is**, focused on the use of digital tools for learning, with the support of the John D. and Catherine T. MacArthur Foundation. NWP continues to produce a growing bank of online and print resources related to digital literacy including the Digital Is online community (<http://digitalis.nwp.org/>) and practical guides for administrators, teachers, and parents. More than 50,000 attendees participate annually in Writing Project professional development programs that include a focus on the uses of technology for writing.

(2) Potential Contributions

Developing New Knowledge and Practices for Improving the Teaching of Writing Across Content Areas. Developing and maintaining the human capital to provide sustained, high-quality classroom instruction in the nation's classrooms sits at the core of many transformational education policies. Local schools and districts call upon Writing Project teacher-leaders for a range of program design and leadership efforts, including significant activities related to implementation of the CCSS. NWP teacher-leaders contribute to this ongoing professional learning at the local level, with more than 6,700 teacher-leaders delivering programs annually.

Well-known current Writing Project teacher-leaders, K-university, are also at the forefront of contributing new knowledge and practices to the field of writing and literacy: Jessica Singer Early and Meredith DeCosta (*Real World Writing for Secondary Students*, 2012); Todd Finley (<http://www.edutopia.org/user/19606>); Kelly Gallagher (*Write Like This*, 2011; *Improving Adolescent Writers*, 2009); Bud Hunt (<http://www.budtheteacher.com>); Donalyn Miller (*The*

Book Whisperer, 2009); and Meenoo Rami (<http://engchat.org>). They join the more than 70,000 NWP teacher-leaders who have participated in our intensive model of leadership development in the teaching of writing since the first 25 teachers were recruited in 1974.

The strong national network of local Writing Project sites serves as a constant support that teachers can draw upon to enhance their ability to innovate and lead improvement efforts benefiting schools and the students they serve.

Expanding Online Learning Opportunities for Teachers, Including Professional Development in Teaching Multi-Modal Writing. Across K-12 classrooms, teachers of writing see many possibilities for using digital tools to teach writing and to engage young people in using writing to learn across the disciplines. Here the NWP network has been on the forefront of providing high-quality professional development in bridging the old world of paper and pencil technologies and the new world of digital writing (National Writing Project et al., 2010).

NWP also leads the way in using digital technologies to support professional development and online communities of practice that bring together teacher-leaders to discuss the latest research, access important new classroom strategies, respond to critical educational issues, and collaborate on publishing and disseminating what they have learned. NWP also works with other online communities to provide a range of learning opportunities, including Peer 2 Peer University (<http://p2pu.org/en/>), a provider of open education experiences supported by the William and Flora Hewlett Foundation and the National Center for Literacy Education (NCLE), a coalition of 30 professional education associations focused on supporting literacy learning across content areas. NWP also partners with and provides content to education-focused media outlets such as Edutopia and the New York Times Learning Network, and public television stations like KQED and WETA.

(3) Importance and Magnitude of Results and Outcomes

An emerging research consensus identifies effective teaching practices for improving students' writing achievement. Graham and Perin's 2007 synthesis of experimental and quasi-experimental research identified 11 elements of effective writing.¹ More recently, the What Works Clearinghouse (Graham, et al., 2012) published a practice guide that offers four recommendations for teaching writing at the elementary level.² These research-based classroom practices sit at the heart of professional development offered by NWP. Over the past two decades, NWP has amassed a substantial body of research that provides strong evidence of the effectiveness of its professional development model. NWP's sustained professional development programs have been shown to assist teachers in adopting practices demonstrated to have a positive impact on student achievement in writing, including in schools that serve concentrations of high-need students. In addition to providing high-quality, effective professional development, NWP builds the overall capacity of the educational system by enhancing teachers' leadership development, engaging them in educating their colleagues, and supporting their continued involvement within the profession.

Competitive Preference 1: Supporting Practices and Strategies for which there is Strong Evidence of Effectiveness

Studies of NWP's elementary, middle, and high school professional development programs demonstrate improved student performance when professional development in writing is aligned with teachers' instructional contexts. The evidence base examining the impact of NWP's

¹ Graham and Perin (2007) identified the following 11 elements as having the potential to improve student writing achievement: writing strategies, summarization, collaborative writing, specific product goals, word processing, sentence combining, prewriting, inquiry activities, process writing approach, study of models, and writing for content learning.

² Graham, et al. (2012) made four recommendations for improving writing in elementary schools: provide daily time for students to write; teach students to use the writing process for a variety of purposes; teach students to become fluent in handwriting, spelling, sentence construction, typing, and word processing; and create an engaged community of writers.

intensive professional development programs on teachers' classroom practice and student writing performance includes 1 experimental, 1 value-added, and 20 quasi-experimental studies in 8 states involving more than 7,000 students. One study (Kim, Olson, Scarcella, Kramer, Pearson, van Dyk, Collins, & Land, 2011) has been reviewed and meets What Works Clearinghouse (WWC) Standards without reservations; a second study (Pritchard & Marshall, 1994) is included in the WWC practice guide *Teaching Elementary School Students to be Effective Writers* (2012). Together, these studies offer strong evidence that NWP programs have a positive impact on students' writing achievement (National Writing Project, 2010). (See Appendix E).

Evidence of Effectiveness in Secondary Programs. At the high school level, one experimental and four quasi-experimental studies support the effectiveness of teacher-led professional development for teachers and schools serving substantial proportions of high-need students. All five studies show statistically significant differences in growth in student writing performance, with effect sizes ranging from .32 to .67. These effect sizes are comparable to those reported in *Writing Next* (Graham & Perin, 2007), a meta-analysis of experimental and quasi-experimental studies on elements of writing instruction, such as collaborative writing ($d=.75$), pre-writing ($d=.32$), process writing approach ($d=.32$), and study of models ($d=.25$). These elements of writing instruction are often the focus of NWP's professional development efforts.

Santa Ana Unified School District, California. A multisite cluster randomized trial of a cognitive strategies approach to teaching text-based analytical writing for mainstreamed Latino English language learners (ELLs) took place in the Santa Ana Unified School district, where 78% of students are low-income (Kim, et al., 2011). The study, which meets What Works Clearinghouse standards without reservations, involved 9 middle and 6 high schools; 103 English teachers stratified by school and grade were randomly assigned to the Pathway Project

professional development intervention or control group. The Pathway Project, conducted by the University of California Irvine Writing Project site, draws on well-documented instructional frameworks that emphasize a cognitive strategies approach to support students' English language development. Pathway teachers participated in 46 hours of training and learned how to apply cognitive strategies by using an on-demand writing assessment to help students understand, interpret, and write analytical essays about literature. Multilevel models revealed significant effects on an on-demand writing assessment ($d=.35$) and the California Standards Test in English language arts ($d=.07$). Teachers who participated in a second year of professional development were able to replicate the positive impacts with a new cohort of students (Olson, Kim, Scarcella, Kramer, Pearson, van Dyk, Collins, & Land, 2012). Multilevel models showed that students taught by these teachers scored .67 standard deviations higher than students in the control condition, nearly double the effect size of year one.

California Statewide Program. This California Writing Project professional development was designed to improve the achievement of traditionally non-college-bound students through focusing on instructional approaches to teaching analytical writing and critical reading. Its effectiveness was examined in a 2-year study with high school teachers from rural northern California, Los Angeles, and greater Sacramento (Marlink & Wahleithner, 2011). The six high schools in the first year of the study served student populations in which 61% to 100% were eligible for free or reduced-price lunch (FRPL) and 3% to 44% were designated as ELL. Teachers participated in 60 hours of professional development; between pre- and post-professional-development, program students' holistic scores increased by .57, while comparison students' holistic scores increased by .24; the difference was statistically significant ($p<.05$), with an effect size of .48 (Hedges' g).

In a follow-up study, the program focused on 11th and 12th grade teachers in two Greater Sacramento area high schools serving student populations in which 69% to 100% were eligible for FRPL and 30% to 44% were designated as ELL. In the second year, teachers participated in 11 full-day and 4 afternoon professional development sessions. Differences between pre and post holistic scores for the program students were on average .16, while differences between pre and post holistic scores for comparison students dropped by a similar amount (- .15), resulting in a statistically significant difference at the $p < .05$ level in favor of the Writing Project students and an effect size of .32 (Hedges' g).

Mississippi Statewide Program. The researchers examined the effects of 36 hours of professional development provided to 9th grade teachers in two high schools, one in a rural area and one near a small population center (Swain, Graves, & Morse, 2006). These schools, with respectively 64% and 95% FRPL-eligible populations comprised of 81% and 99% African American youth, were each matched with two comparison schools on economic, ethnic, school expenditure, and prior performance factors. Teachers participated in interactive workshops, study groups, coaching, and classroom demonstrations focused on effective strategies for improving writing. Program students' holistic scores increased by .5 point between pre and post intervention, while comparison students' holistic scores increased by .1 point; this difference was significant ($p < .001$), with an effect size of .59 (Hedges' g).

New York City. One study of the New York City Writing Project (NYCWP) focused on professional development partnerships with high schools (Campos & Peach, 2006), in which the NYCWP worked intensively with schools for at least 2 years, offering on-site consultation with teachers 1-4 days per week and 45 hours of afterschool, graduate seminars. The work engaged teachers in the study of the theory and practice of writing, exploration of aspects of the writing process, and enactment of practices and ideas with students. In the first year of the 2-year study,

NYCWP worked with 6 high schools at which 64% to 95% of the students were FRPL eligible and between 12% to 91% of students were classified as ELLs. During the first year, the program students' holistic scores increased by .6, while comparison students' holistic scores decreased by .1; the difference was statistically significant ($p < .01$) with an effect size of 0.58 (Hedges' g).

Evidence of Effectiveness in Elementary School Programs. Like the studies of NWP's work at the secondary level, quasi-experimental studies of NWP's work in elementary schools show positive effects. Three studies in diverse regions of the country demonstrated moderate effects of .36 to .40, which are in line with meta-analyses of classroom practices and formative assessment practices that are shown to have moderate to large impacts (Graham, Harris, & Hebert, 2011; Graham & Perin, 2007). The professional development in each of these studies focused on two or more of the approaches recommended in WWC's *Teaching Elementary School Students to be Effective Writers* (2012).

St. Louis County, Missouri. This study examined the effects of an intensive 45-hour teacher-inquiry program that sought to build a core group of teacher-leaders who could develop and sustain a literacy improvement model for grades 3-5 (Singer & Scollay, 2006). The study focused on predominately African American students (82 program and 78 comparison, of whom 54% and 37% were FRPL-eligible respectively), with similar baseline Gates McGinite reading test scores. Program students' holistic scores increased by .48, while comparison students' holistic scores dropped slightly (-.03); this difference was statistically significant ($p < .05$), with an effect size of .40 (Hedges' g). In addition, the Writing Project students' reading ability over the year grew at a significantly faster rate than that of the comparison students.

Mississippi Suburban/Rural. This study involved 3rd-5th grade teachers (Swain, Graves & Morse, 2007) working in two schools with similar accreditation levels, prior test scores, and

demographics (including at least 50% FRPL-eligible students), but located in different areas of the state. The 34-hour professional development program focused on strategies for teaching a variety of positive features in writing, augmented by model responses to student writing. Between pre- and post-intervention, program students' writing improved on all 6 analytic attributes as well as on the holistic score, which increased by .7 points. In contrast, comparison students experienced no change in their holistic scores. The difference was significant ($p < .001$), with an effect size of .48 (Hedges' g).

Greenville, South Carolina. This study involved a quasi-experimental design for studying a 3rd–5th grade writing program (Kaminski, Hunt-Barron, Hawkins, & Williams, 2010). Pre and post qualitative indicators, including classroom video data, were collected to determine the influence of 47 hours of professional development on teachers' philosophies and practices for teaching writing. Student writing performance was determined by pre and post on-demand writing samples and augmented by pre and post samples of portfolio pieces written by program students. Program students' holistic scores increased by 1 point, while comparison students' scores increased by .58; this difference was significant ($p < .001$), with an effect size of .36 (Hedges' g).

Evidence of Impact of Leadership Development

In addition to providing intensive professional development in school settings, NWP intentionally develops teacher-leaders through its Invitational Summer Institutes (ISI) and ongoing opportunities for professional learning. Writing Project institutes extend the reach of these teachers by further expanding their knowledge, enhancing their leadership development, engaging them in educating their colleagues, and supporting their continued involvement in the profession. Three studies provide evidence that both students of teachers who participate in an

ISI and students of teachers who participate in professional development facilitated by these teacher-leaders grow more in their writing achievement than comparable students.

Alabama State-Wide Study. An Alabama study of middle and high school teachers (grades 7-12) involved 17 program teachers who participated in the ISI and follow-up professional development and 15 comparison teachers (nominated by their principals as excellent English teachers). Program teachers implemented strategies they learned during the ISI, such as organizing their classrooms into interactive communities of practicing writers and designing writing instruction as a non-routine task. The work arrangements in these classrooms supported critical thinking and problem-solving between the teacher and students (Whyte, 2011). The students in program classrooms (n = 246) demonstrated statistically significantly greater growth in a holistic measure of writing achievement over the course of one school year than those in comparison classrooms (n = 231) with an effect size of .22 (Hedges' g , $p < .001$) (Whyte, 2011).

Kentucky State-Wide Study. In 2011-12, the Kentucky Education Professional Standards Board (EPSB) undertook a study of factors influencing writing achievement in Kentucky between 2008 and 2010 (Hibpshman & Walters-Parker, 2012). Kentucky assesses writing in grades 5, 8, and 12 using an on-demand writing task. The study's first phase involved a value-added analysis of teachers' impact on student writing achievement, using data from 3,476 unique teachers and 184,264 unique students. The results indicated that teachers accounted for 27% to 36% of the variance in students' writing achievement, after controlling for student characteristics (gender, ethnicity, disability status, and gifted status). The second phase involved a survey of all eligible teachers, divided into five levels based on their fixed effects scores indicating teacher effectiveness. Correlational analyses between teachers' effectiveness ratings, classroom practices, pre-service preparation, and participation in in-service professional development

showed that “more effective teachers were more likely to have attended one or more NWP activities” (section 5, Hibpsman & Walters-Parker, 2012), which would likely have included the Writing Project ISI. Although this study does not establish causal relationships, it corroborates the findings from NWP’s research base and offers state-wide evidence about the impact of participating in NWP professional development.

Multi-State Study of Professional Development Led by Writing Project Teacher-Leaders. Pritchard and Marshall (1994) conducted a quasi-experimental study in which teacher-leaders replicated dimensions of NWP’s summer institute model in 15-day professional development sessions for 366 teachers from 5 public school districts in 4 states.³ An equal number of comparison teachers from the same schools, teaching the same subjects and grades, were recruited to participate in the study; pre- and post-test essays were collected from a total of 3,927 students. Teachers who participated in the professional development were more likely to use effective teaching practices (e.g., writing processes, peer groups, formative assessment) than those in the comparison group. In addition, students in participating teachers’ classrooms outperformed those in comparison classrooms with overall effect sizes of .48.

Impact Summary

Collectively, the studies of impact on student achievement meet the SEED criteria for strong evidence (See Appendix E for details). The student results are consistent and favorable in those aspects of writing that are aligned with the expectations of college- and career-ready standards and that the NWP is best known for, such as development of ideas and organization. And, students in Writing Project classrooms gained more often than their peers in the area of conventions, suggesting that basic skills also benefit from the NWP approach to teaching writing

³ This study is included in the What Works Clearinghouse Educator’s Practice Guide, *Teaching Elementary School Students to Be Effective Writers* (2012). Retrieved from: http://ies.ed.gov/ncee/wwc/pdf/practice_guides/writing_pg_062612.pdf

(NWP, 2010). In studies with statistically significant results, effect sizes on gains in holistic measures of student writing performance ranged from .22 to .67. They demonstrate the positive impact of NWP's programs on student writing achievement in high-need schools from different geographic regions, at different grade levels, and in urban, rural, and suburban schools.

B. Quality of the Project Design and Services

Building on NWP's effective professional learning model and national improvement infrastructure focused on the teaching of writing, the proposed project will improve the teaching and learning of writing across content areas. NWP will provide high-quality professional development for K-12 teachers in the teaching of writing to help students meet rigorous academic standards through the NWP national network of 190 university-based sites working in partnership with local schools and districts serving all 50 states. NWP proposes three goals:

- (1) Increase the number of K-12 teacher-leaders well-prepared to improve the teaching of writing across content areas, including two cohorts of middle-grade science teachers.
- (2) Increase sustained professional development services in the teaching of writing, focused on helping students meet challenging standards for college- and career-readiness, for K-12 teachers serving concentrations of high-need students.
- (3) Develop and disseminate online professional development learning experiences to improve the teaching of writing across content areas.

To accomplish these goals, NWP will rely on its comprehensive professional and leadership development model, which has been refined over the past 39 years and remains responsive to rigorous new standards for writing in all disciplines. As a school-university partnership, NWP offers a unique combination of experience, capacity, and leadership development in the teaching of writing and literacy across content areas (McDonald et al., 2004). NWP is the only national professional development model for improving the teaching of writing across the disciplines that works with a local capacity-building enterprise, the local Writing Project site.

The NWP model at each local Writing Project site includes three basic components: developing local teacher leadership to address the teaching of writing in all its complexity; providing extensive continuing education programs to teacher-leaders to enable them to address emerging needs and important innovations in the field; and using that leadership to conduct professional development programs and provide leadership in local schools and districts. With the support of university-based faculty and senior teacher-leaders, Writing Project sites develop teacher-leaders' ongoing capacity to support K-12 students in meeting academic writing standards across disciplines.

Program Goal 1. Increase the number of teacher-leaders well-prepared to improve the teaching of writing across content areas.

Program Objective and Expected Outcome. NWP will recruit and develop 3,000 locally-based, expert K-12 teacher-leaders over a 2-year period through 90 intensive Invitational and Advanced Institutes offered in each of 2 years. These 3,000 teacher-leaders will teach an estimated 120,000 students annually and will also contribute to the work of local Writing Project sites to provide high-quality professional development programs in the teaching of writing across content areas. They will also have access to ongoing Writing Project learning opportunities both face-to-face and online following their institute participation.

In addition, 5 local Writing Project sites will offer intensive Invitational Science and Literacy Institutes for up to 80 middle-grade science teachers over a 2-year period (2014-15 and 2015-16). These institutes (described below) will focus on discipline-specific requirements for writing in science, specifically the development of claims, use of evidence, and communication of reasoning, and will support participating teachers' classroom practices and leadership roles. The goal is to develop science teacher-leaders who will be well-prepared to support their students'

ability to write scientific arguments based on evidence and to develop resources and professional learning opportunities for additional teachers beyond the duration of the project.

Writing Project Invitational and Advanced Institutes include a focus on effective classroom practice and using research-based evidence to support continued professional learning. Sites typically recruit 14-18 exemplary K-12 teachers for the initial intensive (120 hour) Invitational Summer Institute. During the institute, every participant must give a demonstration of a successful approach to teaching writing, writing and reading, or discipline-specific writing in a content area. Demonstrations must include the classroom practice, the supporting research, and the student writing that resulted. Every participant reads and discusses research in the teaching of composition, including research on specific processes (e.g., drafting and revision), on specific populations (e.g., teaching writing to English language learners), on various genres of writing across the disciplines, and on writing assessment. All participants write in multiple genres for multiple purposes to gain firsthand experience in the kinds of writing they teach their students and in the kinds of interventions students might need.

Writing Project site directors, who are university or college faculty with a broad range of expertise in the fields of writing and composition, language and literacy development, and teacher education, co-lead these intensive development experiences. The K-12 teachers who are selected similarly exhibit a range of expertise and include elementary teachers, reading specialists, teachers of English language learners, middle and high school English teachers, and subject-matter specialists in other disciplines, particularly science, history, and mathematics. The NWP model expects all these participants to both contribute their professional expertise to the overall capacity of the Writing Project and to develop new skills and knowledge that will enable

them to work effectively as teacher-leaders to support improved instruction and student writing achievement in their local schools and districts.

Over the past 2 years, both Invitational and Advanced Institutes have paid increasing attention to the CCSS, and have helped sites prepare teacher-leaders to facilitate professional learning focused on rigorous new expectations for writing in general and for discipline-specific writing in particular.

Table 1 shows the numbers of educators who were recruited and selected to participate in ISIs in 2011 and 2012, and the percentage who served at each school level. Participation figures are projected for 2013.

Table 1. Invitational Summer Institute (ISI) Participation by Grade Level

Year	NWP Sites	NWP Sites Surveyed**	Survey Respondents	Elementary	Middle	High School	College/ Other
2011	197	179	2,303	31%	21%	34%	14%
2012	193	146	1,838	35%	22%	31%	13%
<i>2013</i>	<i>190</i>	<i>150</i>	<i>2,000</i>	<i>33%</i>	<i>21%</i>	<i>32%</i>	<i>14%</i>

SOURCE: ISI Survey conducted by Inverness Research. Figures represent a slight undercount of participants because the response rate is not 100%.

**The number of sites included in the survey is lower than the total number of NWP sites because shifts in NWP funding mean that not all NWP sites offer an ISI annually.

This table does not include Advanced Institutes, which are reported separately. In 2011-12, there were 1,806 participants in NWP Advanced Leadership Institutes held at 108 sites. These institutes lasted a median of 40 hours, which represents a significant additional investment in leadership capacity building.

Developing teacher-leaders who work with traditionally underserved students is critical for preparing these students to meet college- and career-ready writing standards. Significant numbers of NWP teacher-leaders serve economically and linguistically diverse students. In 2011

and 2012, 66% of active public school teachers who participated in an Invitational Summer Institute worked in schools serving a large proportion of students who are eligible for FRPL, one indicator of economic need. Similarly, over the past five years, 72% of teachers who participated in an ISI have taught in classrooms with at least one English language learner, and 25% of teachers have worked in classrooms where at least 20% of their students are ELLs.⁴

The Invitational Summer Institute also supports the development of teacher-leaders who teach writing across the disciplines. Over the past 5 years (Summers 2008–2012), 48% of the teachers who participated in the ISI taught in areas other than English Language Arts (including those in elementary positions in which they teach all subjects), while nearly 52% reported teaching ELA as their primary subject. In particular, 4% (521) ISI participants in the past 5 years reported teaching science or math as their primary discipline. NWP’s recent track record demonstrates its capacity to achieve ambitious leadership development goals across content areas and to provide leadership in schools serving high-need communities.

Competitive Preference Priority 3: Promoting Science, Technology, Engineering and Mathematics (STEM) Education

Develop Science Teacher-Leaders. With SEED funding, NWP will offer 10 Invitational Science and Literacy institutes (50 hours) in 5 diverse geographic locations over a 2-year period. Building on NWP’s broad experience with writing in the disciplines, as well as our track record of engaging STEM teachers in our effective Invitational and Advanced Institute leadership development model, we will launch a new cadre of science literacy leaders. NWP’s

⁴ It is noteworthy that significant numbers of NWP teacher leaders are prepared to serve the educational needs of ELLs and immigrant-origin youth whose home language is not English, given the rapidly growing number of such youth in the U.S. educational system. Indeed, 22% of youth growing up in the U.S. today have at least one foreign-born parent; these students comprise the fastest growing segment of the school-aged population (Hernández, Denton, & Macartney, 2007).

documentation of the work, along with an independent impact evaluation, will offer new knowledge to the field about the central role of writing in the teaching and learning of science. Specifically, it will provide insights into professional development designs and instructional practices that can improve middle-grade science teachers' abilities to impact students' capacities to engage in scientific discourse, especially writing scientific arguments.

The science teacher-leaders work will begin with a 4-day national institute for leaders from participating local Writing Project sites, which will launch a community of practice to be facilitated via social networking and connected learning opportunities throughout the project. This work will address two intertwined questions: *How do we help students more effectively use writing/composing to learn science?* and *How do we help students learn to be more effective science writers?* These national leadership activities will support the development of common agreements that will guide local work. As part of an ongoing community of practice, site leaders will discuss plans, programs, and work to date, including participating in regular opportunities to learn from national science practitioner experts and research experts in the field.

Local professional development will focus on creating and teaching authentic science writing tasks, in which students engage in writing arguments using scientific evidence. Participating teachers will examine how to support students in developing claims, supporting these with evidence, and conveying their scientific reasoning through writing. Professional development content will engage teachers in investigating the *Framework for K-12 Science Education* and *Next Generation Science Standards (NGSS)*.

Each local Science and Literacy program will begin with an intensive invitational leadership institute (30 hours) in Summer 2014. During 2014-15, participating science teachers will engage in embedded professional development (20 hours) which will allow them to analyze how they

are enacting practices and approaches to science writing in their classrooms. Professional development will involve participants in observing and analyzing demonstrations of classroom practice by expert science teachers; engaging in the types of authentic scientific writing their students will encounter; creating and reviewing writing assignments that emphasize arguing from evidence and evaluating and communicating scientific information; analyzing samples of student writing and planning next steps for further developing students' understanding of science; and investigating current research, standards (NGSS), and professional literature focused on the types of writing essential to the discipline of science.

As in traditional NWP ISIs, participating teachers will analyze their own science teaching practice and be able to articulate what their approach to science literacy is and why it is important. Teachers completing this professional development will have additional opportunities to engage in leadership opportunities both face-to-face and online and to prepare for further science literacy leadership in their schools and districts. A second cohort of science teachers will participate in this professional development sequence in 2015–16.

While the proximal effects of the professional development will be on participating science teachers' classroom practices in writing and their leadership capacities, the ultimate outcome will be a measurable impact on students' growth in writing scientific arguments. With a minimum of 50 hours, the intensity and duration of this science leadership professional development is comparable to other Writing Project professional development work that has influenced both teacher practice and student writing outcomes. Based on earlier studies of NWP's intensive professional development, we anticipate effect sizes of .20 – .25 on direct measures of students' science argument writing, an essential component of science learning. This professional development will be the focus of a cluster-randomized trial (See Section E).

Program Goal 2. Increase sustained professional development services in the teaching of writing, focused on helping students meet challenging standards in writing for college- and career-readiness, for K-12 teachers serving concentrations of high-need students.

Program Objective and Expected Outcome. NWP will increase sustained professional development services in the teaching of writing for K-12 teachers to 100 additional schools and small districts serving concentrations of high-need students as defined by FRPL and Title I eligibility through working with 50 schools in 2013-14 and an additional 50 schools in 2014-15. Local Writing Project sites will offer at least 30 hours of professional development per school during the academic year.

These sustained professional development services will focus on helping students meet challenging standards in writing for college- and career-readiness. Expected outcomes are:

- a broadly shared understanding and implementation of curriculum and instruction in writing across content areas aligned to challenging standards such as the CCSS for ELA;
- improved teacher practice in the teaching of academic writing by: a) increasing the *amount of time* spent on writing instruction and in the *number of extended writing assignments*; b) increasing the *use of research-based instructional strategies* for teaching writing in ELA classrooms (e.g., writing about reading, study of models, use of a writing process approach, use of peer response and feedback, use of formative writing assessments); c) increasing the use of *writing to learn strategies*, as well as the number of more *extended writing assignments* that involve the analysis and use of evidence, in other *disciplines such as science*; and d) improving the *quality of writing assignments* and increasing their *alignment* with college- and career-ready standards (e.g., arguments that analyze non-fiction texts, development of informational texts that convey complex ideas and information); and
- improved student writing achievement in informational and argumentative writing.

The policy press for raising academic standards in general, and the widespread adoption of the CCSS in particular, creates a significant need for continued and expanded professional development in the teaching of writing if we are to support higher achievement and enable more young people to make successful transitions to college and careers. This is particularly true in schools serving a high proportion of high-need students.

Duration and Focus. To address this need, local Writing Project sites will use SEED funds to provide intensive professional development programs in academic writing for 100 high-need schools and small districts. Consistent with a growing research consensus (Desimone, 2009), NWP maintains that professional development must have sufficient duration and focus to help teachers make substantial changes in their practice and have a measurable impact on writing achievement. In all of the NWP quasi-experimental studies that showed statistically significant differences in student writing achievement in schools serving high-need students, teachers participated in a minimum of 30 hours of professional development, with most participating in 45 or more hours. Thus local Writing Project sites will provide customized professional development lasting a minimum of 30 hours during the school year to support teachers, schools, and districts in addressing these rigorous academic standards for all students.

Table 2 shows the total number of schools that received at least 30 hours of Writing Project professional development in 2010-11 and 2011-12, demonstrating that NWP has the capacity to lead such work at scale. Of these schools, 66% were Title I schools, and Writing Project sites offered 30 to 60 hours of professional development per school. SEED funds will support intensive professional development of 30 or more hours in 100 additional high-need schools with limited prior participation in Writing Project professional development.

Table 2. NWP-Provided Intensive Professional Development to Schools, > 30 Hours per School

Year	All Schools (n)	Title I Schools		
		Schools n (%)	Hours/ School Median	Educator Attendance/School Mean (sd)
2010-11	641	422 (66%)	43	8.6 (15.1)
2011-12	701	460 (66%)	45	7.1 (12.3)
2013-14	720	475 (66%)	44	7 (13)

SOURCE: All data are drawn from NWP’s Site Profile System. Data related to schools’ Title I status are drawn from NCES Common Core of Data.

Alignment and Content Focus. For professional development to have impact, it must also engage teachers in the study of content and be aligned with teachers’ beliefs and local standards (Desimone, 2009). To achieve Goal 2, local Writing Project sites will design customized professional development aligned with college- and career-ready standards. Such professional development, like that studied in NWP’s research, will engage teachers in activities such as studying the latest research on teaching writing and using digital tools; examining student work samples (formative assessment); participating in classroom demonstration lessons and debriefing; developing and refining teaching modules; and testing out new strategies and approaches to teaching. While all content will emphasize college- and career-ready standards and focus on research-based practices in writing (Graham & Perin, 2007; Graham, et al., 2012), specific content will be determined based on the strengths and needs of participating schools.

To illustrate what this type of sustained professional development can look like, we offer an example from one small, rural, high-need district in West Fork, Arkansas. The district enrolls 1,193 students, 56% of whom are FRPL-eligible. The district covers 131 square miles in the secluded Boston Mountain range. During the 2012-13 academic year, more than 30 3rd – 8th grade teachers are participating in a year-long, intensive professional development program to improve the teaching of writing in all content areas as the school transitions to the CCSS. In partnership with the Northwest Arkansas Writing Project, these teachers are engaging in active

learning experiences that support teachers in translating their own learning into practice through full-day and after-school professional development workshops, and on-site residency days that include classroom modeling of writing lessons as well as individual observation and feedback. Becky Ramsey, Principal at West Fork Middle School, stated: “As we implement the new Common Core State Standards, it is increasingly evident that we must first provide our teachers with more intensive professional development in instructional writing strategies so they can assist and confidently support our students in reaching more rigorous academic standards.”

Drawing on National Network Infrastructure. NWP will work with local Writing Project sites to support the design of high-quality professional development aligned with the CCSS, through a range of learning opportunities that focus on writing pedagogy, assignment design, and formative writing assessment. Through online seminars, face-to-face national meetings, and monthly conference calls with senior leaders in the NWP network, Writing Project sites will strengthen their local work by building on and adapting successful approaches used elsewhere, sharing resources and ideas, and engaging in collective problem solving around the challenging issues that arise when conducting intensive professional development. Local Writing Project sites are already creating a rich repertoire of strategies for offering effective professional development related to the CCSS (e.g., Writing Project teacher-leaders in Kentucky are designing and facilitating much of the state’s professional development related to the roll out of the CCSS [Appendix D]). Through these cost-effective mechanisms, SEED funding will facilitate sharing of knowledge among sites. This allows the national network to operate as a learning community, in which local designs are optimally informed by the best current knowledge available, and where local sites can contribute their ideas back to the broader learning community.

Maintaining the High Quality of the Writing Project Model. One way NWP operates as networked learning community is through an annual review of local Writing Project work. Each NWP site provides a report on the status and activities of the site, including Invitational and Advanced Institutes, and extensive data on site professional development activities at the school and district level. These reports are reviewed by peer site leaders through an online review process and the reports are shared broadly across the network through the *Model At Work*, an interactive, curated collection of on-demand resources and programs. (See Appendix E.) Peer reviewers select descriptions of exemplary practices from each site's report and post these practices in the *Model At Work* to showcase innovative program design and strategic use of resources. In addition, staff review and monitor program data and budgets submitted annually by each site and provide feedback and technical assistance to sites encountering challenges.

Program Goal 3. Develop and disseminate online professional development resources to improve the teaching of writing.

Competitive Preference Priority 2: Improving Efficiency (Cost-Effectiveness)

Program Objective and Expected Outcome. In addition to providing face-to-face professional development programs, NWP will assist teachers and schools in strengthening curricula and practice related to challenging standards for college- and career-readiness through the development of a total of 20 online learning experiences (OLEs) to be accessed by teachers more broadly through NWP's open-access online community of practice and disseminated as Open Education Resources (OERs) through other partners and platforms, such as Peer 2 Peer University and the National Center for Literacy Education (NCLE). NWP also has a growing collection of OERs on NWP's Digital Is website (<http://digitalis.nwp.org/>). These new learning experiences will also become part of NWP's web-based professional development infrastructure,

which will allow NWP and its local sites to reach additional teachers more efficiently through online learning environments.

Capacity for Developing High-Quality, OER Professional Development. NWP-developed OLEs provide wide distribution of resources, teaching exemplars, and facilitated learning opportunities to the nation’s teachers. Since 2011, NWP has been developing and field-testing OLEs with Writing Project leaders and university partners (see Appendix E). The online format allows for a range of innovative approaches, including synchronous and asynchronous opportunities for discussion and facilitation; participation by teachers and administrators across school contexts; and utilization of a range of primary source material. One 2012 OLE example is “Knowing How: Reading and Composing Informational Text for the CCSS” offered by the Idaho Writing Project from September –December 2012 for 53 participants, including middle and high school teachers across content areas as well as school administrators. This OLE pilot was very successful and provides a course that can be offered multiple times across a range of platforms.

Another OLE developed by Bud Hunt, a Writing Project teacher-leader based in Colorado, “Writing and the Common Core: Deeper Learning for All” (<http://p2pu.org/en/groups/writing-common-core-deeper-learning-for-all/>), supported secondary teachers in an examination of the Common Core ELA expectations for science and social studies, and has been openly licensed for adaptation and reuse through the P2PU platform.

NWP will develop and disseminate a total of 20 new OLEs, 10 in each of 2 years. OLEs will be designed so that they can then be remixed into local offerings as well as power more “massive” online learning opportunities such as those NWP is offering through Peer 2 Peer University’s School of Education (<http://p2pu.org/en/>).

Capacity to Engage Teachers in Online Communities of Practice. Forming teacher professional learning communities, in-person and online, creates opportunities for teachers to learn with and from each other (Horn, 2010; Little, 2003). The core practices of building and sustaining professional learning communities and integrating the involvement of national experts through our network of university-based sites are well-refined in the NWP (Lieberman & Wood, 2003). Locally and nationally, NWP's deep experience in building professional communities has provided a solid foundation for the transition to online social learning platforms. This shift affords the potential to expand access to professional learning efficiently and at scale.

Combining face-to-face NWP professional development with additional "just-in-time" learning opportunities facilitated by NWP's network of exemplary educators enhances and extends participatory learning opportunities and resource development for teachers and districts. NWP's online communities will continue to be used to share promising practices, to intentionally scale up practices with promising evidence for student impact or that advance leading edge work in the use of digital tools for writing.

NWP's proposed project represents a comprehensive approach to addressing the central role of challenging academic writing to learning across disciplines. The three complementary and interwoven strands of work – preparing teacher leaders, providing high-quality professional development, and developing rich on-line learning experiences for teachers – will each contribute to improving the teaching of writing across content areas in the participating schools and districts. The level of intensity and duration of this professional development is consistent with that examined in previous studies of NWP's strong impact, which were conducted in diverse regions, student populations, and grade levels. Thus, we are confident that this project will result in significant shifts in teachers' approaches to teaching writing across disciplines.

Project Objectives and Milestones

Objective	Milestones			
	October 2013 – March 2014	April – September 2014	October 2014 – March 2015	April – September 2015
1a. Recruit and select 3,000 teachers across content areas to participate in intensive literacy leadership development	<ul style="list-style-type: none"> • RFP and selection of 90 local Writing Projects to develop intensive Invitational and Advanced Institutes (cohort 1) 	<ul style="list-style-type: none"> • Writing Projects develop leadership institute plans, recruit and select 1,500 participants, and conduct 90 intensive institutes (cohort 1) • 1,500 expert K–12 teacher-leaders available to provide local leadership in schools and districts (cohort 1) 	<ul style="list-style-type: none"> • RFP and selection of 90 local Writing Project sites to develop intensive institutes (cohort 2) • 90 Writing Projects develop leadership institute plans and recruit and select 1,500 participants (cohort 2) 	<ul style="list-style-type: none"> • Writing Projects conduct 90 intensive Invitational and Advanced institutes (cohort 2) • 1,500 expert K–12 teacher-leaders available to provide local leadership in schools and districts (cohort 2)
1b. Prepare and develop highly effective science teacher leaders through 50+ hours of science literacy leadership development	<ul style="list-style-type: none"> • Recruit 5 Writing Project sites for science literacy leadership program and evaluation • Recruit 60-80 middle-grade science teachers to participate in science literacy leadership program • 5 Writing Projects develop program plans 	<ul style="list-style-type: none"> • Launch program at national institute for leaders from 5 Writing Projects • 30-40 middle-grade science teachers participate in 30+ hours of leadership institutes 	<ul style="list-style-type: none"> • 30-40 middle-grade science teachers participate in 20+ hours of embedded professional development (PD) 	<ul style="list-style-type: none"> • 30-40 middle-grade science teachers complete PD • 30-40 middle grade science teacher-leaders available to provide PD in schools and districts • Launch science literacy leadership PD for 30-40 control-turned-treatment middle-grade science teachers at 5 Writing Project sites
2. Provide 30+ hours of PD in 100 high-need schools to help teachers and students achieve college- and career-ready standards in writing across content areas	<ul style="list-style-type: none"> • Select 50 Writing Project sites to provide PD • PD launched in 50 high-need schools across the country (cohort 1) 	<ul style="list-style-type: none"> • Teachers in 50 high-need schools complete 30+ hours of PD (cohort 1) • 50 Writing Projects selected for high-need school funding (cohort 2) • PD programs launched in 50 additional high-need schools (cohort 2) 	<ul style="list-style-type: none"> • PD programs continue in 50 additional high-need schools (cohort 2) 	<ul style="list-style-type: none"> • Teachers in 50 high-need schools complete 30+ hours of PD (cohort 2)
3. Develop and disseminate 20 online learning experiences (OLEs)	<ul style="list-style-type: none"> • Topics identified for 10 OLEs focused on college- and career-ready standards 	<ul style="list-style-type: none"> • Support design teams and review plans • Develop and launch 10 OLEs, available as open educational resources 	<ul style="list-style-type: none"> • Topics identified for 10 additional OLEs focused on college- and career-ready standards 	<ul style="list-style-type: none"> • 20 OLEs available as open educational resources

C. Quality of the Management Plan and Personnel

(1) Management Plan and Personnel

The proposed SEED project will be managed by the NWP senior leadership, which has long experience in innovating with, providing technical assistance to, and monitoring the network of NWP sites to improve the teaching of writing in a wide range of school settings and communities. The team has extensive experience with ongoing program evaluation and the dissemination of resources and strategies to enhance teacher knowledge and expertise. (See Appendix A for full resumes.) The team works collaboratively and meets bi-weekly to review and monitor overall progress and effectiveness, discuss critical needs or challenges, and plan for the future. Each member of the senior team also works with additional staff to conduct and support the proposed program of work. Each local Writing Project site also has a leadership team that functions to guide the work on the ground. Our qualifications and roles are:

Dr. Sharon J. Washington is NWP Executive Director. She provides overall direction and leadership to the NWP senior leadership team. Under her leadership, NWP has leveraged its national improvement infrastructure to continue to serve as a force to improve the teaching of writing for all students. She has more than two decades of professional experience and scholarly work in higher education administration, teacher preparation, social justice education, and nonprofit leadership. She holds a Ph.D. from The Ohio State University School of Education.

Judy Buchanan is NWP Deputy Director. She has more than three decades of leadership in urban education, including twenty years of teaching in high-need schools. She holds a M.A. from Temple University School of Education. She will be responsible for the coordination and monitoring of the SEED project, leading external dissemination efforts, and providing reports to the U.S. Department of Education.

Dr. Elyse Eidman-Aadahl is the NWP Director of National Programs and Site Development. She has developed a wide range of NWP national programs, including the organization's extensive digital media programs. She has three decades of experience holding leadership positions in education at both the high school and university level, and holds a Ph.D. in Curriculum Theory from the University of Maryland, College Park. Working with the senior leadership team, she will have primary responsibility for oversight of NWP local site partnerships and online communities of practice.

Dr. Linda Friedrich is NWP Director of Research and Evaluation. She guides the implementation of NWP's research agenda, and coordinates and integrates research and evaluation with NWP's mission and strategic plan. For two decades she has worked at school-reform organizations, including NWP for a decade. She holds a Ph. D. from the Stanford University School of Education in Administration and Policy Analysis. She will oversee all internal program data collection and serve as the primary liaison to the independent evaluator.

Dr. Tanya Baker is Director of National Programs for NWP. She will be responsible for leading the development and further dissemination of the Online Learning Experiences and leading the Science and Literacy leadership development institutes. She has more than two decades of experience in education, including twelve years as secondary school teacher. She holds an Ed.D. from the University of Maine.

Joye Alberts is Director of Site Development for NWP. She will be responsible for leading technical assistance to support local sites' implementation efforts, particularly professional development in high-need schools and the design of cross-site learning opportunities. She has over three decades of teaching experience at the secondary and

university levels. She holds an M.Ed. from the University of Oklahoma School of Education.

Patrick Sweeney is NWP Director of Finance. He has more than two decades of experience in nonprofit financial management. He holds a B.A. in Economics from the University of California, San Diego. Working with the senior team, he will provide overall budgetary oversight and provide all required financial reports to the U.S. Department of Education.

SRI International will serve as the independent evaluation contractor with **H. Alix Gallagher, Ph.D, Katrina Woodworth, Ed.D.,** and **Nicole Arshan, Ph.D.** serving as co-principal investigators. Dr. Gallagher's leadership experience includes major studies on teacher professional development that use experimental and quasi-experimental designs to estimate the effects of interventions on teacher and student outcomes. Dr. Woodworth has a long record of research on K–12 school reform efforts and experience leading large, mixed-methods research studies. Dr. Arshan specializes in causal design and experimental and quasi-experimental evaluation of education interventions.

PROJECT MANAGEMENT PLAN AND TIMELINE

	Year of Program Quarters		October 2013 – September 2014				October 2014 – September 2015			
			F	W	S	S	F	W	S	S
Maintaining the high quality of the Writing Project model										
NWP Management and Senior Leadership Team holds quarterly meetings to monitor progress toward goals (SJW, JB, EEA, LF, PS, TB, JA)										→
Conduct online review of NWP Site Reports and monitoring of program data and budgets (JB, EEA, LF, TB, JA)	X	X	X	X	X	X	X	X	X	X
Program Goal 1: Increase the number of K–12 teacher-leaders prepared to improve the teaching of writing across content areas, including middle grades science teachers										
Support the design of 90 intensive institutes for K–12 teachers at local Writing Projects for cohorts 1 (1) and 2 (2) (JA)		1	→	→		2	→	→	→	→
Identify and invite 5 local Writing Project sites to participate in the SEED Science Literacy Leadership program and evaluation (EEA, TB)	X									
Support the design of 5 Science and Literacy Institutes (30+ hours) for science teacher-leaders and academic-year professional development (20+ hours) (EEA, TB)		X	X	X	X	X	X	X		
Support the design of 5 Science and Literacy Institutes (30+ hours) for science teachers previously randomly assigned to the control condition (EEA, TB)								X	X	
Program Goal 2: Increase sustained professional development in the teaching of writing across content areas, focused on helping students meet challenging standards in writing for college- and career-readiness, for K–12 teachers serving concentrations of high-need students										
Select through RFP process 50 high-need schools for sustained professional development programming for cohort 1 (1) and cohort 2 (2) (SJW, JB, EEA, LF, PS, TB, JA)	1			2						
Design and provide online seminars and face-to-face meetings on topics such as CCSS, formative assessment, and using digital tools for local Writing Project site leaders implementing intensive PD programs in cohorts 1 (1) and 2 (2) (TB, JA)	1	→	2	→	→	→	→	→	→	→
Provide individual technical assistance as needed to ensure high-quality programming (LF, JA)										→
Program Goal 3: Develop and disseminate online professional development learning experiences to improve the teaching of writing across content areas										
Support the development of 20 online learning modules to support teachers in learning about effective practices related to college- and career-ready standards in cohort 1 (1) and cohort 2 (2) (TB, EEA)	1	→	→	→	2	→	→	→	→	→
Sustainability										
Support broad dissemination of the learning modules through web-based platforms for cohorts 1 (1) and 2 (2) (EEA, JB)			X	X	X	X	X	X	X	X
Provide opportunities to disseminate new knowledge through social networking, connected learning opportunities, and NWP Radio at conferences and with external partners (JB, JA)		X	X	X	X	X	X	X	X	X
Evaluation										
Leadership: ISI and Advanced Institute surveys collected (C) and reported (R) (LF)			C	C	R			C	C	
Leadership and High-Need Schools: Site Profile data collected (C) and reported (R) (LF)	C	→	→	R	C	→	→	R	C	→
SEED Science RCT: Design and pilot measures (LF, SRI)										
SEED Science RCT: Recruit and randomize 60-80 participants (LF, SRI)		X								
SEED Science RCT: Teacher data collected (teacher survey, teacher assignments) (Baseline = B, Final = F) (SRI)			B					F		
SEED Science RCT: Student on-demand science argument writing samples collected (Baseline = B, Final = F) (SRI) and scored (S) (SRI, LF)					B			F	S	
SEED Science RCT: Reporting (I = Interim will focus on measures & teacher baseline) and Final Dec. 2015 (SRI)				I						F
<i>SJW: Sharon J. Washington; JB: Judy Buchanan; EEA: Elyse Eidman-Aadah; LF: Linda Friedrich; PS: Patrick Sweeney; TB: Tanya Baker; JA: Joye Alberts. Note: Management/Senior Leadership supervise NWP staff to carry out the program goals above. SRI: SRI International.</i>										

D. Sustainability

(1) Build Capacity and Yield Results Beyond the Period of Federal Assistance

The NWP model is a university-school partnership model. Beyond the term of this two-year SEED project, the NWP network will continue to build a broad base of public and private support, generating additional revenues based on our demonstrated ability to develop and deploy teacher-leaders in service of improving the teaching of writing across content areas.

At the end of the 2015-16 academic year, 3,000 additional NWP teacher-leaders will be directly reaching 120,000 students across the country. They will also join other NWP teacher-leaders in providing high-quality professional development programs in the teaching of writing, both face-to-face in their local communities and online. Investing in the development of teacher-leaders through the NWP will continue to provide critical leadership and professional development program offerings in the teaching of writing across content areas as the new CCSS are implemented in classrooms and schools across the country.

Retain Teachers in Teaching. Investment in the development of teacher-leaders through the Writing Project helps to retain teachers and serves schools and districts more broadly over time. Data collected through NWP's Legacy Study, which surveyed 5,512 individuals who participated in ISIs between 1974 and 2006, demonstrates that 77% of teachers remain in the classroom for at least two years following the ISI and 97% remain in the field of education. On average, teachers who participate in the ISI teach for 22.7 years. Similarly, an independent, quasi-experimental study comparing teachers participating in Courage to Teach (CTT) with NWP teachers, in which NWP teachers served as the counterfactual, found that NWP teachers had slightly higher levels of professional engagement on two indicators of the Malasch Burnout Inventory than CTT teachers ($d = .12$). Descriptive analyses showed that NWP teachers planned to remain in teaching, with not a single respondent planning to leave the profession as soon as possible and only 3.3%

of the sample saying they would leave if a better opportunity emerged (Geil, 2011). In addition to remaining in the classroom for extended periods, Writing Project participants who leave the classroom play a variety of leadership roles in education with 3.2% becoming school administrators, 3.1% playing district leadership roles, and 11% working in higher education, often in teacher education.

Develop Additional Resources for Improving Writing Instruction Across Content Areas. In addition to the continuing work of these teacher-leaders in their local districts, we anticipate their contributions to a range of educational support efforts. Writing Project teacher-leaders are engaged in the development of curriculum units and learning modules across the curriculum that are designed to reflect the new standards and to better connect reading and writing.

In particular, building on NWP's work with science teachers described in Section B, NWP will collaborate with WETA to produce an integrated library of in-classroom video that demonstrates effective writing instruction for middle school science students. WETA is currently working on three projects, all of them focused on highlighting instructional strategies and approaches aligned with CCSS. The new in-classroom video will feature skilled Writing Project science teachers using research-based strategies to teach science writing, and will showcase students' writing progress during the course of a school year. The same classrooms will be filmed during the 2014-2015 school year. This resource will be made available through WETA's extensive dissemination network as well as used in NWP online learning experiences.

This new teacher-learning resource complements NWP's work with the Literacy Design Collaborative (LDC), funded by the Bill & Melinda Gates Foundation. LDC is a network of organizations with strong literacy instruction capability that has developed an authoring tool that

allows teachers and others to develop innovative curricula, training modules, assessment threads, and other instructional tools.

NWP materials are and will continue to be open educational resources, available through NWP platforms, including the NWP website (www.nwp.org) and Digital Is (<http://digitalis.nwp.org>). The NWP website already provides one of the largest open collections of resources related to the teaching of writing, including articles, teaching resources, and video and audio content produced by scholars in the field. In addition, Digital Is has been fully licensed under Creative Commons to serve as a companion resource for personal and group learning and participation. Similarly, our proposed 20 OLEs will be available for open use, adaptation, and re-mixing both through the NWP network of sites and to teachers directly.

In keeping with the recent emphasis on digital collaboration, NWP has designed a number of ways for its communities of practice to connect online, such as *NWP Connect*, *NWP Radio*—as well as Digital Is—that are open to all who are interested in the teaching of writing (<http://bit.ly/be14ML>). In just over a year, NWP Connect has grown to more than 7,000 unique users from all across the educational spectrum, and NWP Radio has aired 86 shows with more than 17,000 downloads since its beginning in 2010. NWP also has an active social media presence via blogs, Facebook, Twitter, Google + communities, and online hangouts, all of which is available to educators with an interest in writing.

(2) Findings and Results Used By Others

Sustained Professional Development in Schools. The proposed approach to expanding sustained professional development opportunities focused on teaching writing in high-need schools will build on findings from previous NWP evaluations. Overall this work will yield important working tools, processes, and insights for enacting the CCSS. First, participating

teachers and teacher-leaders will generate teaching tools, processes, and assignments that can be readily shared with other teachers. Second, local Writing Project sites will develop professional development materials such as seminar designs, professional readings, demonstration lessons, and consulting approaches that will illustrate productive ways of supporting students to work toward meeting high standards in writing. Third, at a national level, the NWP will create and document ways of supporting a distributed network to create high-quality, intensive professional development that can support changes in teaching practices. NWP will make materials available through its extensive web-based delivery system and online communities of practice.

Digital Tools for Teaching Writing and Online Community. NWP is already a recognized leader in the use of digital learning tools and online communities of learners. SEED funding will allow us to develop 20 additional online learning modules which will provide access to high-quality professional development content beyond the NWP community. We will work with our partners, including the MacArthur Digital Media and Learning Initiative (DML), Peer 2 Peer University (<http://p2pu.org/en/>), and Edutopia, to expand access to these new resources. This effort builds on NWP's prior successful efforts with creating open educational resources such as the Digital Is website and community of practice.

Leveraging and Sustaining an Improvement Infrastructure. Strong writing and literacy skills are essential for success in the digital age. In order to support young people's growth as writers, teachers need high-quality professional development opportunities to strengthen their practice and hone their leadership skills. NWP has unparalleled capacity to address this challenge, with a network of 190 university-based sites located within reach of 75% of the nation's teachers, leading edge professional development and OERs in digital literacy, and strong evidence of programs that lead to improved student writing achievement. Over 2 years, the proposed SEED

project will: develop 3,000 new NWP teacher-leaders across the country, including two cohorts of middle-grade science teacher-leaders; engage 100 high-need schools in intensive professional development focused on rigorous standards in writing across the disciplines; and create 20 new online professional development modules. The SEED investments will be sustained through NWP's network of sites and teacher-leaders, who will lead improvement efforts benefitting the schools and students they serve over time.

E. Quality of Project Evaluation

The NWP is committed to documenting the impact of its work on teachers' practices and student writing achievement through rigorous, independent research, and to using what it learns to enhance its ongoing work and inform the field. Currently, SRI International is conducting two cluster-randomized trials that examine the efficacy of NWP's work with high-need schools and districts. These studies examine professional development that is comparable in intensity, duration, and service area to the high-need schools work proposed in Section B.

The first study, *Evaluating the Impact of Professional Development to Meet College- and Career-Ready Standards in High-Need Elementary Schools*, is designed to estimate the impact of the professional development on third-, fourth-, and fifth-grade teachers' instructional practices in writing related to CCSS and on students' opinion writing (Award Number S367D120015). This efficacy study uses a randomized controlled trial (RCT) design, with both qualitative and quantitative data on implementation. The study is taking place in 44 elementary schools located in 13 states. The professional development focuses on the implementation of the CCSS in writing and requires Writing Project sites to provide 45 hours of professional development to 75% of third-, fourth-, and fifth-grade teachers. Results will be available in December 2013.

The second study, *Evaluation of NWP's College-Ready Writers Program*, is also a cluster-randomized trial and is being conducted as part of NWP's i3 Validation Grant (Award Number U411B120037). This study investigates the impact of NWP's work in 42 high-need rural districts located in 10 states. The professional development is designed to support the implementation of the CCSS in writing for grades 7-10 and requires NWP sites to provide 90 hours of professional development over 2 years to 80% of 7th through 10th grade teachers in these districts. Final results will be available in Spring 2017; interim reports will be available annually. NWP will use what it learns from this extensive investment in cluster-randomized trials as it implements new work in high-need elementary and secondary schools.

The evaluation for this SEED proposal will take a two-pronged approach. First, NWP's independent Research and Evaluation Unit will collect and analyze participation data and teacher surveys to ensure that NWP achieves the established project goals. NWP will use its data systems to determine the reach and cost of the NWP network's services to teachers and schools and to evaluate the quality of services offered.

Second, SRI International will field a new cluster-randomized trial (described below) focused on the development of teacher leadership capacity for science literacy. SRI's independent evaluation will assess the impact of this type of programming on teachers' knowledge and practices related to writing in science, students' ability to write scientific arguments, and teachers' leadership. In addition to being appropriate to the goals of this proposal, this evaluation promises to make significant contributions to the field by documenting science teachers' preparation to take on leadership roles vis-à-vis science literacy and improving the outcomes of students in making scientific arguments.

Analysis of Teacher Leadership and High-Need Schools Objectives

Goal 1. Build Teacher Leadership Capacity. NWP will field a brief survey of all teachers who participate in Invitational and Advanced Institutes funded through SEED. This survey will be administered through a web-based platform and will collect data on participants' demographics and current employment information (which will be linked to NCES data), their experiences in the institute, and their perceptions of its immediate impact. This survey will allow NWP to compare the overall quality of SEED-funded work with historical surveys of ISI participants. In addition, NWP will field follow-up surveys with teachers the spring after their participation in Invitational or Advanced Institutes. These follow-up surveys will track current employment information and will invite teachers to report on their use of practices and strategies for teaching writing, ongoing professional development participation, and participation in leadership activities.

Survey questions that ask for descriptive information such as frequencies, trends, and specific features of programs have been shown to have good validity and reliability (Mayer, 1999). Surveys can, therefore, measure specific features of instruction and professional development (Desimone, 2009). We will draw items from robust survey instruments that measure classroom practices associated with student gains in writing achievement (e.g., Applebee & Langer, 2011a).

Goal 2. Provide Sustained Professional Development to High-Need Schools. To determine the numbers of teachers and students working with high-need schools, NWP will collect professional development activity data related to the 100 high-need schools and small districts served. Local Writing Project sites submit data through NWP's site profile system including: information about the site's service area, its leadership and teacher-consultant pool, and its programs and activities. Site profile data are compiled with data from NCES, along with sites'

financial and Invitational and Advanced Institute participant survey data to prepare individual site profiles, which are available to sites for internal review and strategic planning. Professional development activities will take place in two waves, with sites serving 50 high-need schools in 2013-14 and an additional 50 in 2014-15. Analysis of final participation data will be completed by January 2015 and January 2016 respectively. In addition, NWP will collect qualitative reports from sites that will allow us to understand the quality of the work. The reports will also provide evidence of the ways in which teachers and students are using what has been learned through professional development (e.g., analyses of student writing samples, reports of local and state writing assessments, analyses of local surveys of and interviews with participating teachers).

Impact Evaluation of Invitational Science Literacy Institute

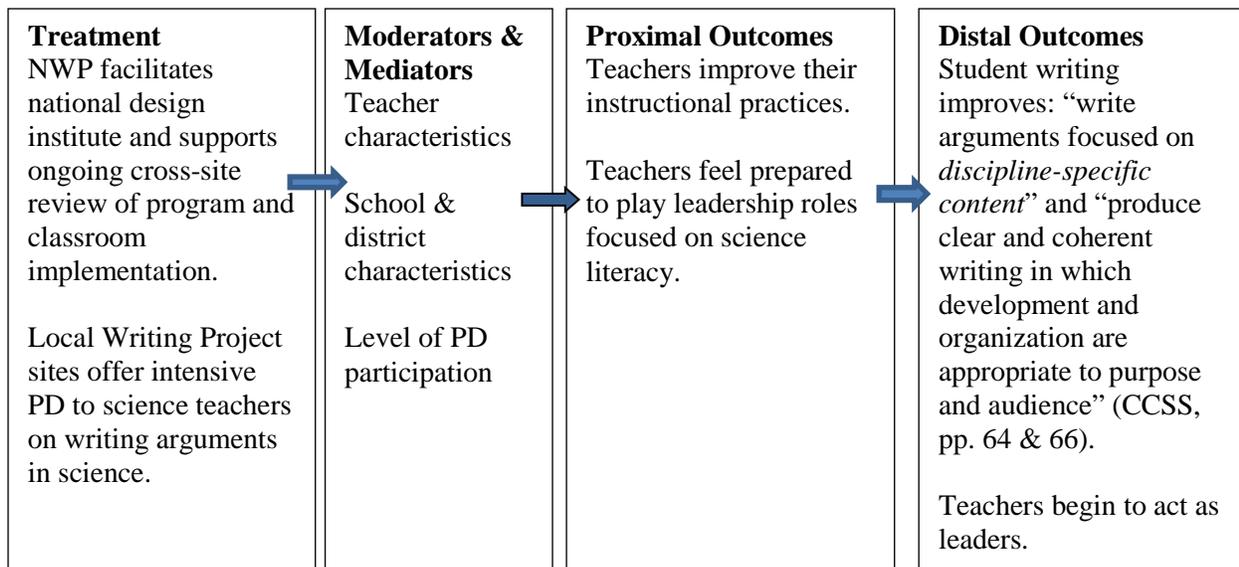
SRI International will conduct an independent evaluation of NWP's efforts to develop teacher leadership capacity in the area of science literacy (SEED Science). The study uses a cluster-randomized design, with teachers as the unit of randomization. Data collection includes measures of teacher and student outcomes and integrity of implementation (listed in Table 3). Findings will be shared through annual reports and regular project briefings, giving NWP data necessary to support implementation with integrity.

Conceptual Framework. The conceptual framework that guides the evaluation assumes that local Writing Project sites will provide sustained professional and leadership development to middle-grade science teachers. The specific content, format, duration, and timing of professional development will be locally determined, though local Writing Project sites will be expected to meet specified implementation criteria: a) offering at least 50 hours of professional development for participating teachers over a 1-year period; b) participation in professional development by at least 6 science teachers at each local Writing Project site in grades 6, 7, or 8; c) a focus on

supporting teachers in offering instruction that will enable students to develop and demonstrate competency in writing science arguments; d) a focus that is consistent with common agreements developed by the Writing Project sites during the national launch institute (See Section B, Objective 1); and e) a focus that supports teachers’ development as leaders.

The conceptual framework (Figure 1) shows how intensive professional development (PD) programs designed by local Writing Project sites (the treatment) would influence teacher practices (proximal outcomes), which in turn would impact student writing (distal outcomes). This causal chain would be mediated by the level of professional development participation and moderated by teacher and school characteristics. This model further spells out a theory of leadership development that begins with development of instructional strength and self-efficacy as a proximal outcome and teacher leadership roles and behaviors as a distal outcome.

Figure 1. Science Literacy Leaders: Conceptual Framework



Evaluation Questions. SRI will address the following research questions (Table 3):

Table 3: Research Questions and Data Sources

		<i>PDM</i>	<i>Observations/ Interviews</i>	<i>Teacher Survey</i>	<i>Teacher Assignments</i>	<i>Writing Prompts</i>
Implementation						
(1)	To what extent was SEED Science implemented with integrity and fidelity?	•	•	•		
(2)	What contextual factors impeded or enhanced implementation of the SEED Science program features and teachers' attempts to change their practices?		•	•		
(3)	How did NWP technical assistance for sites support implementation?		•	•		
Outcomes						
(4)	What is the effect of the program on students' argument writing in science?					•
(5)	What is the effect of the program on science teachers' instructional practices in writing?		•	•	•	
(6)	To what extent does SEED Science support teachers' development into teacher leaders?		•	•		
Mediation						
(7)	Which features of the SEED Science program appear most related to changes in teacher practice?	•	•	•	•	
(8)	Which teacher practices correlate with improvements in students' argument writing in science?		•	•	•	•

Sample and Study Design. During fall 2014, the NWP will select five local Writing Project sites to implement the SEED Science program during summer 2014 and the 2014-15 school year. At least 30 hours of professional development will take place during summer 2014, requiring the recruitment and randomization of teachers during the preceding spring. Recruitment of teachers will start in January 2014 so that baseline data can be collected prior to randomization in spring of 2014. Due to anticipated teacher mobility, we will recruit a total of 80 teachers, allowing for

33% of pre-treatment attrition so that the final study sample has 60 middle-grade science teachers (30 treatment and 30 control/delayed treatment) across the five participating sites. Teachers will be blocked into pairs within districts to protect the integrity of the experiment, given predicted attrition.

Control teachers⁵ will agree to refrain from professional development in argument writing in the sciences during the implementation year, except through compliance with school or district requirements; treatment teachers will participate in the SEED Science program. SRI will monitor implementation integrity to track whether teachers receive a minimum of 50 hours of professional development, and the extent to which the professional development has content and features consistent with the common agreements, even as that model is adapted to local context across the five sites. Additionally, SRI will collect data on the influence of local and national context during the treatment year, because curricular and other policies (e.g., district implementation of Common Core State Standards) could lead to changes in practices for both treatment and control teachers. Randomization will allow for an unbiased estimate of the impact of the SEED Science program on student and teacher outcomes.

Data Measures and Collection. Data will come from six related data collection activities: professional development monitoring, professional development observations, interviews, teacher surveys, teacher assignments, and student on-demand writing (See Appendix E).

Professional Development Monitoring (PDM) captures fidelity of implementation and will document teachers' participation as well as the duration, format, and content of the professional development. Open-ended questions will ask local Writing Project sites to describe the professional development and explain their rationale.

⁵ Funding will be provided to local Writing Project sites to offer comparable professional development to the teachers randomly assigned to the control condition in 2015-16.

Professional Development Observations. Researchers will observe summer teacher professional development provided by local Writing Projects using a structured observation form. These observations will assess the extent to which PD offered is aligned with the common agreements. Researchers will schedule site visits to observe PD during the school year.

Interviews. Interviews with Writing Project leaders, district and/or school administrators, and both treatment and control teachers will gather data to triangulate implementation and outcome data and to better understand the context in which the teachers are operating. Questions will focus on the policies and practices shaping writing instruction in science at the school and district, perceptions of SEED Science implementation, supports and barriers, and perceived outcomes. These data will provide formative feedback to NWP.

Teacher Surveys. Surveys collected from each middle-grade science teacher in the treatment and control groups will provide data about teachers' attitudes and beliefs about the role of writing in science instruction, participation in professional development on science writing, professional development content, and instructional practices (especially their use of argumentation in science instruction), as well as teacher background. Measures proposed have been validated and found to be reliable (Gallagher et al., 2012).

Teacher Assignments. Teacher assignments will provide a lens into how teachers create and organize opportunities for students to become more effective writers of science arguments. The methods we will use build on SRI's work using teacher assignments (Gallagher et. al., 2012; Newmann, Lopez, & Bryk, 1998). Each spring semester, teachers will select two assignments that they consider to be their best writing assignments in science, along with related student work. They will submit a cover sheet for each assignment that describes the assignment, its goals, and the instructional context. Assignments will be coded by trained scorers using

procedures used by SRI on previous studies (see Gallagher et. al., 2012), which achieved inter-rater reliability rates from 72%-89%.

Student Writing Samples. Student writing in response to an on-demand writing prompt, which will require students to form an argument based on analysis of data and complex scientific texts, will provide a measure of student writing performance. Writing samples will be scored using NWP’s Analytic Writing Continuum (AWC) system, which is currently being modified to account for the disciplinary demands of science writing. The AWC has demonstrated high inter-rater reliability (overall 90% agreement across attributes). (See Appendix E)

SRI will randomly sample 12 student prompt responses from each middle-grade science teacher in the treatment and control conditions. SRI will use the fall baseline data to check for equivalence between treatment and control groups and adjust for teacher-level pre-treatment performance in the impact analysis. Spring scores will be used as outcomes for impact analysis. Mediation analysis will use these data to examine the relationship between teacher practice and student growth. SRI will also assess whether there are any consistent state or district assessments that measure students’ skills in forming scientific arguments. If such an assessment is in place, SRI will include it as an additional student outcome measure.

Table 4. Administration of Measures

Measures	Spring 2014	Summer 2014	Fall 2014	Spring 2015
Professional development monitoring		X	X	X
Professional development observation		X		X
Interviews	X		X	X
Teacher surveys	X			X
Teacher assignments	X			X
Student on-demand writing samples			X	X

Data Analysis

Impact. To assess the impact of the SEED Science intervention on outcomes of interest, SRI will estimate hierarchical linear model (HLM) with the effect of the intervention estimated at the teacher level (binary outcomes will be estimated using a hierarchical model with logit link function).⁶ HLM adjusts standard errors associated with the clustering of observations and point estimates for the different sample sizes of clusters, thus minimizing Type I errors associated with nested models (Raudenbush & Bryk, 2002). SRI will check for baseline equivalence between treatment and control groups; adjust for teacher and, where appropriate, student-level baseline performance; and then analyze the impact on student outcomes to determine whether the program had an effect.

The predicted writing ability for student i , taught by science teacher j as a function of teacher assignment to treatment is given as:

$$Y_{ij} = \beta_0 + \beta_1(Treatment) + \chi_j\beta_2 + \alpha_{ij}\beta_3 + e_{ij} + r_j.$$

Random effects e_{ij} and r_j allow for error at the student and teacher level, respectively. SRI will include χ_j , a vector of teacher-level covariates, including the teacher's mean baseline score and a vector of district dummy variables, to improve precision of the estimate. Student covariates, α_{ij} , will include the student's fall score and grade level. β_1 provides an estimate of the effect of assigning a teacher to receiving SEED Science PD on student writing (the Intent to Treat effect).

SRI estimates that this experiment will have a Minimum Detectable Effect Size (MDES) of .19 with 80% power. To allow for some attrition of teachers (and, therefore, their paired counterpart in the other treatment condition), SRI estimates this MDES using a sample size of 60 teachers. SRI plans to score 12 sets of writing samples from students who were able to complete

⁶ Only one teacher will be recruited per school, to minimize the potential for contamination and maximize the potential future breadth of impact of the teacher-leaders.

the assessment in both fall and spring, negating any concerns about student attrition. From an earlier NWP study⁷ SRI estimates a between teacher (and, by proxy, school) ICC of .164 and a teacher-level R^2 of .72. Using an equivalent student level R^2 of .72 gives the MDES of .19; a lower student-level R^2 of .5 results in a slightly higher MDES of .21.

To estimate the impact of SEED Science on teacher outcomes, teacher assignments will be analyzed using similar methodology to that used to analyze student-level outcomes. Survey outcomes measures will require an OLS model with district-fixed effects, whereas the bottom level in HLM models using teacher assignment data will be the assignments themselves, given the multiple measurements per teacher. Data from our prior study suggest using similar assumptions as above. SRI also assumes a survey and teacher assignment response rate of 85%, changing our estimated teacher sample to 10 per district. These assumptions, using an R^2 of .5 and .72, give an estimated MDES of .57-.43 for survey outcomes and .35-.26 for teacher assignment outcomes.

Data will be imputed as is deemed appropriate given the pattern of missingness (at random or not). SRI will also estimate a second set of analyses using hours of writing PD received in each condition to instrument for treatment. These will provide the effect of the Treatment on the Treated, accounting for the difference in treatment received in each group.

Mediation. The quantitative and qualitative data collected will help us unpack the causal chain between the professional development given to teachers, the change in teacher practice, and the resulting change in student ability. SRI will use proximal teacher outcomes as mediator between differences in teacher practice and changes in student outcomes. For teachers in the treatment group, SRI will use data gathered to measure implementation integrity to understand

⁷ Gallagher, H. A., Woodworth, K. R., Wang, H., Bland, J. A., Bosetti, K. R., Cassidy, L., Gallagher, L. P., Hafter, A., McCaffrey, T., Murphy, R., F. & Shields, P. M. (2012). *National evaluation of Writing Project school partnerships: Final report*. Menlo Park, CA: SRI International.

how differences in PD provided by the local Writing Project site mediate the relationship between the NWP-provided PD and changes in teacher practice. Interviews will triangulate these findings.

Evaluation Resources

To meet the timeline of project tasks, SRI will follow a detailed work plan that lays out all the tasks needed to accomplish the project objectives, with the associated timeline, and SRI will meet regularly with NWP staff to review progress and problem solve about upcoming issues in project implementation and its evaluation. SRI will prepare regular reports to submit to the National Writing Project. The budget includes a \$922,000 sub-contract for SRI. Additional funds are budgeted for NWP staff and resources to carry out the tasks beyond the RCT.

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