Investing in the Improvement of Education:

Lessons to be Learned from the National Writing Project

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Investing in the Improvement of Education: Lessons to be Learned from the National Writing Project

Introduction: The Improvement of Education Needs Improving (Getting Better at Getting Better)

In 1983 the National Commission on Excellence in Education published its landmark report, *A Nation At Risk: The Imperative For Educational Reform*[1]. This report warned the nation that "the educational foundations of our society are presently being eroded by a rising tide of mediocrity that threatens our very future as a Nation and a people." Twenty-five years later, the quality and effectiveness of the nation's educational system remain high on the list of national public concerns.

Since 1983 there have been multiple "waves" of educational reform that have sought to address fundamental problems in the system. In spite of many good efforts, there is still pervasive public dissatisfaction with the progress that has been made. Why has the nation not been able to do a better job of ***improving*** the education offered to US students?

It is not for a complete lack of trying. The last two decades have seen many different approaches to "reforming" the school system and improving student learning: national commissions and reports have called for reform and have produced specific recommendations; research has helped to build a knowledge-base about student learning, effective teaching practices, and the dynamics of systemic change; thousands of externally funded projects have sought to address particular deficiencies of educational practice and achievement; and many strong new policies, both at the national and state levels, have sought to shape the practices of districts and schools so that better student achievement would result. But all these efforts, well meaning and often well executed, have proven to be insufficient to improve significantly the health and functioning of the United States education system.

[1] US Department of Education. (1983). *A Nation at Risk: The Imperative For Educational Reform*. Retrieved December 3, 2008, from http://www.ed.gov/pubs/NatAtRisk/index.html.

To make significant progress the nation needs to strengthen its efforts to improve education. Simply put, improvement needs improving; or as one organizational visionary, Douglas Engelbart, states it: "We need to get better at getting better." [2] More profoundly, we need to re-cast the way educational funders and leaders think about educational improvement, and we need to re-examine the assumptions that underlie and shape the way that the nation invests in educational improvement.

Why Educational Improvement Needs Improving

Perhaps it is worthwhile first to understand the ways in which our educational improvement efforts are wanting. What are the sources of their shortcomings? Why don't our educational improvement efforts have more long term and sustained impact? Our group at Inverness Research has studied and evaluated hundreds of educational improvement efforts over the last twenty-five years. Based on our experience, and on others' research, we offer the following analysis for the limited success of efforts to improve education to date:

1) The level of investment in educational improvement is simply too low

There are continuing arguments about the level of funding for education and whether it is sufficient. But there has been less debate about the insufficiency of funding that is allocated to the task of ***improving*** the quality of education. The current level of public funding dedicated to educational improvement is quite low relative to the level of expenditures needed to operate the system. That is, the ratio of improvement funding to operational funding is too low to make significant long-term changes in the system[3].

2) There is a focus on short-term catalytic projects

Expenditures on educational improvement to date have largely focused on short-term programs and projects which are aimed at 1) ameliorating a particular problem (e.g., large class size, weak pre-service education, the absence of support for new teachers); 2) strengthening a particular dimension or domain (e.g., professional development for mathematics teachers); or 3) pursuing a particular strategy toward system improvement (e.g., school

[2] Gonzalez, J. S. (1998). *The 21st Century Intranet*. Upper Saddle River, NJ: Prentice-Hall. From the Preface.

[3] Consider, for example, the National Science Foundation expenditures for the improvement of math and science education at the K-12 level which total less than $1 billion dollars per year. The operational budget of the US K-12 system, by contrast, exceeds $500 billion dollars per year.

restructuring, improved curriculum, increased accountability). Underlying these approaches to educational improvement is a mental model that includes several assumptions:

- First, it is often assumed that the problem being addressed somehow reflects a temporary aberration or deficit that can be "fixed" in a relatively short time with an infusion of extra funds.

- Second is the assumption that there is a single problem to be ameliorated, and that by addressing this specific and critical problem, a short-term project can create large improvements for the whole system (e.g., "fixing" pre-service education will obviate the need for later professional development and other supports).

- Third, there is an assumption that a finite and externally-funded improvement effort will make significant contributions that somehow will be "sustained," "institutionalized," and perhaps even "replicated" by the system itself.

In our experience studying hundreds of programs and projects, we have rarely found any of these assumptions to be true. Each individual project may well do good work and even achieve its goals, but collectively the assortment of short-term projects has not brought about significant long-term sustainable improvements in the functioning of the overall system.

After decades of disappointing experiences—when such projects fail to bring about significant sustainable improvements—there is a tendency to put additional blame on the educational system, citing the lack of progress as more evidence of the system's intransigence. Our experience tells us that it may be more productive to scrutinize more carefully the assumptions that underlie most of the investments made, and to call into the question the improvement strategies that have been pursued, in the improvement of the nation's educational system.

3) The system lacks the capacities needed to do the work of continuous improvement—no matter which strategies or goals are pursued

From our own work in studying educational reform efforts in many different settings, we have found that states, counties, districts and schools simply lack the capacities needed to do the work required to improve their own educational systems. They don't get better because they can't get better. They lack the key resources of time and money to invest in their own improvement. But even

when funding is provided, few school systems have the staff, knowledge, structures or tools to undertake a well-designed improvement process. Many school systems have barely enough capacity and resources to simply ***operate*** their schools; designing and implementing efforts to ***improve*** them is too often out of their reach. From time to time school systems may acquire external funding that allows for the support of special projects or programs; however, once the project funding is over, the project leaders and components rarely are sustained as a part of the permanent system. To sum up the current situation: most states, counties, districts and schools lack most of the capacities needed to do the kind of steady work that is required to improve the nature and quality of instruction on a large scale over the long term. Nor do these systems have enough steady support from outside organizations and agencies to overcome the absence of their own internal capacities.

Rethinking The Design And Funding Of Educational Improvement

> Most importantly, what I would like to see happen is for the political system to recognize, and for the American people to recognize, that investment isn't the same as simply expenditures, that infrastructure requires investment which, over the years, will provide a return, but it isn't the same as spending money for bullets or for just day-to-day expenditures.
>
> -Felix Rohatyn speaking on the News Hour with Jim Lehrer on a recent report *Guiding Principles for Strengthening America's Infrastructure* published by the Center for Strategic and International Studies[4]

The need for education is constant and ongoing; hence, education systems operate as continuing steady-state enterprises. The need to improve education is similarly ongoing; yet the improvement of education is not treated as a steady-state enterprise. The nation's current strategy for investing in educational improvement leads to a wide array of short-term projects that are incoherent and non-cumulative in their effect. These mono-dimensional projects can neither provide for continuous improvement across the system, nor can they

[4] Online News Hour. April 4, 2006. Failing Infrastructure (transcript). Available at http://www.pbs.org/newshour/bb/fedagencies/jan-june06/infrastructure_4-4.html.

build the system capacities necessary to sustain ongoing high-quality improvement work. Like most other industries, US K-12 education would benefit greatly from having the capacity to sustain a process of continuous improvement.[5]

Investment vs. Expenditure - Developing Educational Capital

Investment is not the same as expenditure. Expenditures are one-time outlays of funds for services or products; expenditures pay for things that are consumed. By contrast, investments produce capital that can be used in the future production of goods and services; investments are made not only for the present, but also in search of future returns.

Investing in educational improvement is different than expending money on short-term projects. Investing in educational improvement means that there is a deliberate attempt to create what can be called "educational improvement capital."[6] This kind of capital is critical in that it comprises the capacities needed to do the work of improving educational practice. To design and implement professional development, to implement curricular reform, to introduce practices of formative assessment, and to induce positive policy changes—all of these tasks contribute to improving the quality of education, and none can be achieved without sufficient "capital" being present. Educational improvement capital exists in many different forms. These include *human capital*, those administrators and teachers with the expertise, resources, and mandate to work on system improvements[7]; *knowledge capital* that informs the design of educational improvement efforts; *social capital* comprising the social connections and working relationships between stakeholders and leaders involved in the work of educational improvement; *cultural capital* that informs the enactment of education in a pluralistic democracy; *institutional capital* that is to be found in supportive partnerships, alliances, and collaborations; and,

[5] For more information, see 1) Imai, M. (1986). *Kaizen: The Key to Japan's Competitive Success*. New York: McGraw-Hill/Irwin and 2) Deming, W. E. (1986). *Out of the Crisis*. Cambridge, MA: MIT Press.

[6] Bachetti and Ehrlich describe educational capital in a similar but slightly more limited fashion: "Foundations should use grants to create educational capital – the progressive accumulation, in forms useable by educators, of validated experiences and knowledge about successful educational ideas and strategies. Educational capital is about the design of foundation-funded projects so that they add important material to the stock of available knowledge." Bacchetti, R., & Ehrlich, T. (Eds.). (2006). *Reconnecting Education and Foundations: Turning Good Intentions into Educational Capital*. San Francisco: Jossey Bass.

[7] For an interesting account of investing in human capital, see Elmore, R. (2007). *Educational Improvement in Victoria*. Retrieved December 3, 2008, from http://www.eduweb.vic.gov.au/edulibrary/public/staffdev/schlead/Richard_Elmore-wps-v1-20070817.pdf.

finally, *political and financial* capital that provides resources and a supportive context for educational improvement efforts. Just as capital is critical to the successful growth of a corporation or industry, educational improvement capital is equally crucial to the success of efforts to improve the educational system.

To date, the funding of education improvement has largely been conceptualized as an expenditure—not as an investment. Direct services have been seen as a greater priority than the development and accumulation of various forms of capital that are needed to support the work of improvement. As a result, the whole effort to improve education has been under-capitalized, both in the sense of lacking sufficient funding, and in the sense of lacking the multiple forms of capital (e.g., human, knowledge, political) needed to conduct the work. Expenditures made on short-term projects may well support good and valuable work, but their contributions are often ephemeral and they rarely create sustainable educational improvement capital. What is needed is a mind-shift away from expenditures that focus on direct services, and toward a greater focus on investing in the development of educational improvement capital. The development of such capital will require long-term, sustained, steady investment, as well as a different set of expected outcomes and evaluation measures.

The Improvement Infrastructure

Infrastructure, as defined by the Oxford English Dictionary, is a collective term for the *subordinate parts of an undertaking, a substructure or a foundation*. Another definition puts it thus:

> "Usually the term 'infrastructure' refers to the technical structures that support a society, such as roads, water supply, wastewater, power grids, flood management systems, communications (internet, phone lines, broadcasting), and so forth… Viewed functionally, infrastructure facilitates the production of goods and services—for example, roads enable the transport of raw materials to the production plant and distribution of finished products to markets.
>
> Recent efforts to devise more generic definitions of infrastructure have typically referred to the network aspects of most of the structures and to the accumulated value of investments in the networks as assets. One such effort defines infrastructure as the network of assets 'where the system as a whole is intended to be maintained indefinitely at a specified standard of service by the continuing replacement and refurbishment of its components.' …Still underlying these more conceptual uses is the idea that infrastructure provides organizing structure and

> support for the system or organization it serves, whether it is a city, a nation, a corporation, or a collection of people with common interests."[8]

Infrastructure requires investment. When assets are connected together and interwoven into a coherent whole, then infrastructure is created. Infrastructure is the means by which capital investments are made to work together as a functional supportive system. Infrastructure is literally a structure that lies beneath the surface (often in way that is not clearly visible or noticed) and is intended to provide support that enables and empowers other activities to take place. Unlike expenditures on short-term projects, investments in infrastructure are intended to produce a support structure that is more or less permanent. Infrastructure creates the woof in the fabric of every-day economic and social life.

When various forms of educational improvement capital are integrated into a single system, then an "educational improvement infrastructure" is created. The concept of the "improvement infrastructure" was invented by Douglas Engelbart,[9] a professor emeritus at Stanford and a visionary who thinks about organizations and the improvement of organizations. Engelbart pointed out that every organization has a capability infrastructure, that is, a set of supports that enable people to do the core work of the organization. What Engelbart recognized was that organizations also need ***an improvement infrastructure***. The improvement infrastructure underlies and supports the ongoing work of improving the functioning of the enterprise. The improvement infrastructure needs to have its own dedicated mission, personnel, and resources. It is distinct from, but well connected to, the capability infrastructure. The improvement infrastructure is critical to the quality and long-term health of an enterprise because it is constantly working to make the capability infrastructure stronger. Strong industries have strong improvement infrastructures. In aviation there is a large improvement infrastructure: whole inter-connected industries that focus on basic research, new designs, and increased safety. The drug industry similarly has a strong improvement infrastructure dedicated to research and clinical trials that provides for ongoing innovation and new products. In public schooling, by contrast, there is little in the way of an improvement infrastructure.

[8] Wikipedia. Entry for "Infrastructure." Retrieved December 3, 2008, from http://en.wikipedia.org/wiki/Infrastructure.

[9] Doug Engelbart is interested in ways to improve collective knowledge and information-gathering operations of individuals and institutions. He is perhaps most famous for inventing the computer "mouse," which is used on almost all computers today. For more about Engelbart, see http://www.bootstrap.org.

Just as with physical infrastructure, an improvement infrastructure has to be made of inter-connected functional components that all work together as a system. The educational improvement infrastructure is the support structure that enables a continuous improvement process in education; without it, the efforts to improve education are forced to rely on capacities that are temporary and often even absent.

The educational improvement infrastructure ultimately has to be multidimensional. It has to include those capacities, for example, that are foundational to providing large-scale and high-quality professional development. It has to be able to support curricular improvements through smarter selection, adoption, implementation and ongoing refinement. It has to support the improvement of education through the thoughtful design and usage of assessment procedures. An improvement infrastructure in education can also help shape policies, garner resources, and solicit community supports—all of which can help create a more positive environment for the improvement of teaching and learning. From time to time many states, districts and schools may engage in one or more of these activities. But few, if any, consciously invest in the development and maintenance of the internal capacities that are needed to support a process of continuous improvement within their own systems.

The National Writing Project: An Exemplar of an Educational Improvement Infrastructure

National Writing Project: A Exemplar

The National Writing Project (NWP) seeks to improve the teaching of writing at all grade levels, kindergarten through college. The NWP model is built around a mission and set of guiding principles that have changed very little since the Bay Area Writing Project was created at UC Berkeley in 1974. Over the past thirty-five years The National Writing Project has grown from a single site and evolved into a nationwide network of nearly 200[10] local writing project "sites." Each site carries out a wide range of activities (e.g., professional development, youth programs, research, leadership development) that promote the improvement of the teaching of writing. These local sites are housed on university campuses around the country and co-directed by university and K-12 faculty. Sites vary in maturity: In 2006-07, 87 sites were older than 15 years, 56 sites were between six and fifteen years-old and 50 sites were one to five years

[10] As of May 2008. During the academic year 2006-07, from which data are drawn for this brief, there were 189 sites.

old. The network is also expanding at a deliberate rate: between 1995 and 2007, the NWP network had a net gain of 40 sites.[11]

The national office of the NWP is located on the University of California campus, with national program leaders distributed across the country. The NWP receives annual core funding from the federal education budget. The national office distributes funds to local sites, each of which also garners additional funding from other sources including states, districts, and universities. In 2006-07, each NWP site, on average, offered 27 different programs annually, served 677 participants (300 individual teachers), and involved about 26 active teacher leaders (called "teacher-consultants").

The NWP network was funded at $21.5 million in federal dollars in 2006-07, and local sites leveraged an additional $23.8 million (53% of total funding) in support from host universities, fees for service from local schools, state funds in some states, and miscellaneous local grants. On an annual basis, the NWP offers about 7,500 programs serving nearly 92,000 individual teachers; many of these teachers participate in multiple programs, reflecting a "turnstile" capacity of over 132,000 participants annually. Pursuing a model where leading teachers work with their peers, the NWP identifies and carefully prepares teacher consultants to provide the bulk of the professional development it offers. In 2007 about 6,700 teacher-consultants across the country were actively involved at their local NWP sites in designing and delivering these programs.

The NWP has a number of distinctive features: guiding principles that place the highest value on teacher knowledge and leadership, the creation of mutually enriching university/K-12 partnerships, a carefully sustained and self-reinforcing network infrastructure, a 30-year history of cumulative work, and a national scale of work in terms of sites, services, and people. These features give the NWP a profile that sets it apart from all other teacher development programs in the educational landscape.

Our Study of the National Writing Project

We at Inverness Research began our study of the National Writing Project 14 years ago. It is one of the hundreds of projects we have studied in the last two decades. And yet, when we documented the NWP strategies, work, and

[11] This resulted from the starting up of 106 new sites and the decommissioning of 66 sites because they did not submit annual re-applications or did not meet criteria for federal funding.

outcomes[12], it became clear to us that the National Writing Project was not "just another project." The work of the NWP is ongoing, with the intent of developing and supporting a more or less permanent national network of local writing project sites that can provide a wide range of ongoing supports for teachers. Over time, the NWP maintains, expands and refines its network of local writing project sites; each local site, in turn, continues to design and implement programs and partnerships that are responsive to local needs.

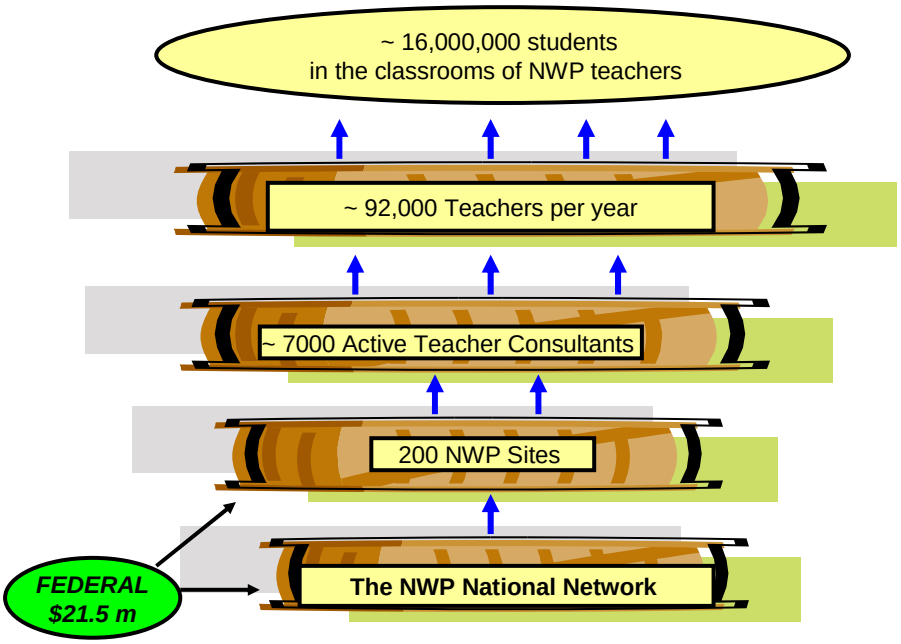
The more we studied the National Writing Project the more we became convinced that it represents a fundamentally different approach to investing in the improvement of education. Unlike short-term projects that address a singular issue and build little sustainable capacity, the National Writing Project appeared to us to more closely resemble an ongoing and evolving educational improvement infrastructure for teacher development—one that can address many different challenges and, year by year, continue to increase its own capacity to support teachers across the country.

The National Writing Project as an Investment in a National Educational Improvement Infrastructure

The federal investment in the NWP provides ongoing support for a national network of professional development sites that serves teachers across the country. The diagram below illustrates the logic (and leverage) of the investment made in the NWP.

[12] For more on the NWP documentation by Inverness Research, see the NWP Reports page of http://www.inverness-research.org/nwp_ppt.html.

Figure 1. Federal Funding and the NWP National Network



The logic starts from the bottom of the diagram. Providing the essential foundation is the NWP national network, with a central office capacity capable of administering the network and supporting the work of 200 sites (i.e., leadership, staff, and resources). The NWP central office provides the following functions which make the overall NWP network of sites strong: national leadership and administration; centralized fundraising; community building through annual meetings, workshops, and retreats; support for local and national leadership development; special initiatives to address particular challenges; support and technical assistance to local sites; site review and quality control; and network-wide research and evaluation.

With support by the NWP national network, the 200 sites of the NWP are empowered to provide a wide range of customized local services to thousands of teachers each year. They are largely able to carry out this work through their development of teacher consultants—teachers who have been identified as having expertise in writing, who participate in an intensive summer Invitational Institute, and who are heavily involved in designing and implementing professional activities that support local teachers of writing. Each year, year after year, the 200 sites provide intensive summer Invitational Institutes to nearly 3,000 teachers. Drawing from this ever-growing pool of potential teacher

leaders, NWP sites are able to create their own local teacher consultant group; currently, there are nearly 7,000 teacher consultants active in the NWP.

Working at their local sites these 7,000 teacher consultants are then able to serve 92,000 individual teachers each year, helping them learn about writing and the teaching of writing. The teacher consultants work with these teachers in ways that are intensive and more in-depth than many professional development projects; on average, each of the 92,000 teachers who participate in the NWP each year spend 19 hours in professional development sessions. The collective knowledge, repertoire and tools for conducting professional development grows each year, and this knowledge is shared across all NWP sites through systematic efforts to promote learning and dissemination throughout the network.

By serving over 90,000 teachers each year, year after year, the NWP is able to build a large pool of teachers who have had at least some experience with and support from the NWP. We estimate conservatively that sixteen million students—one out of every three students in the United States—are currently in the classroom of a teacher who has participated in the NWP.

The scale and scope of the work of the NWP clearly illustrates the cumulative nature and high leverage of investing in a national professional development infrastructure. Because the investment is long-term and ongoing, the NWP has developed a national infrastructure that can operate at a steady state and serve very large numbers of teachers each year. These teachers continue to teach and to draw on their knowledge; consequently, millions of students benefit from the investment made in the NWP.[13]

In summary, the investment made in the NWP infrastructure is cumulative: that is, the work done each year adds to the ability of the NWP to do more work, and better work, the following year. The investment in the NWP infrastructure creates a positive feedback cycle of capacity building and direct service, with each reinforcing the other. Investing in infrastructure over the long term is uniquely cost-effective: there is simply no way to achieve this level and quality of work with any number of short-term catalytic projects.

[13] There are some who credit the National Writing Project with leading the formation of a knowledge-base about the teaching of writing—that is, shared language and shared practices—that is rare in the profession. Lee Shulman, recent past President of the Carnegie Foundation for the Advancement of Teaching, made this assertion in an AERA research panel in April 2005, http://www.aera.net/.

The Unique Advantages of Investing in National Infrastructure

> "There is a fundamental difference between borrowing to support current consumption and borrowing to raise the future standard of living. Unlike expenditures for many other federal programs, infrastructure programs leave behind an asset on the federal government's balance sheet... Federal deficits sap our economic strength, and must inevitably be paid. But failing to support long-term growth could prove even more vexing."
>
> Center for Strategic and International Studies: *Guiding Principles for Strengthening America's Infrastructure*[14]

In this section we explore the concept and unique advantages of investing in national infrastructure in much more detail. We do so because we believe that the power of the National Writing Project can only be grasped by deeply understanding the nature and features of infrastructure. Investing in infrastructure requires a different mindset and approach than investing in operations or even short-term projects. Similarly, evaluating investments in infrastructure requires a different set of criteria than assessing the impact of short-term projects.[15] In what follows we draw on data gathered over the last decade to show how well the NWP is able to meet many of the criteria that are relevant in assessing the value of infrastructure investments. In particular, we point out how the NWP, as an illustrative example of a national infrastructure, addresses the following criteria:

[14] Center for Strategic and International Studies. (2006, March 27). *Guiding Principles for Strengthening America's Infrastructure*. Retrieved December 3, 2008, from http://www.csis.org/media/csis/pubs/060327_infrastructure_principles.pdf.

[15] For example, see St. John, M. (1998). *Measuring the Interim Performance of the Regional Educational Laboratory in the Educational Research Development and Dissemination Infrastructure - What Are The Benchmarks And Indicators Of Success? A Concept Paper*. Retrieved December 3, 2008, from http://www.inverness-research.org/abstracts/ab1998-11_Rpt_DOE_RegionalEducLab.html.

1. Provides services that help meet important national needs

2. Supports and empowers a wide array of national, regional and local activities

3. Provides services at a national scale and sustains a structure that allows for changes in scale

4. Provides services in ways that are equitable both in terms of geography and people served

5. Allows for the cumulative development of capacity and continuing expansion of the services it offers

6. Provides services that are of high quality and thus trusted and used

7. Engineered to be robust, connective, and flexible

8. Achieves economic viability by being highly cost-effective and being supported by multiple sources

9. Provides mechanisms for quality control, learning, self-correction and regeneration

10. Provides a vehicle for making highly-efficient future investments

These characteristics are essential to any well-designed infrastructure, whether physical or organizational. In what follows we discuss the degree to which the National Writing Project is able to realize these characteristics and how they reflect strong advantages over a project-based funding model.

National Infrastructure: Providing services that help meet an important national need

To be worthy of the substantial investment that is required, a national infrastructure should help the nation as a whole address a significant and important challenge. The rail system, interstate highways, and the aviation system all help the nation address crucial needs in the area of transportation. The National Health Service in Britain helps address a critical need for good and accessible health care for all. There is no need for investing in national infrastructure in a domain that is not of national importance. Nor should the nation invest in infrastructure that is not capable of demonstrating its

contribution to actually addressing an important national need. The health of the US education system is clearly an issue of national importance. There are two important fundamental educational needs addressed by the investment made in the NWP infrastructure.

Student Writing and Thinking Skills

Providing students with the ability to write (and think) well is a critical outcome of that educational system[16]. The NWP provides an infrastructure that helps teachers across the country improve their students' writing abilities. Recent studies provide evidence that the work of the NWP does, in fact, contribute to better student writing. An NWP summary of research concludes:

> On seven measures of writing performance tested across the nine studies, students of NWP teachers outperformed their non-NWP counterparts in all 63 contrasts. In 35 (56%) of these contrasts, the differences were so large as to be statistically significant. In no case did students in comparison groups equal or outperform students in NWP classes. The consistency of these findings confirms the effectiveness of NWP professional development[17].

Strengthening the Teaching Profession

Teaching is critical to students' success. And good teaching depends heavily on the existence and support of a strong teaching profession, in much the same way that good health services depend on having a strong medical profession. The NWP infrastructure is able to identify, attract and provide long term support to some of the nation's strongest teachers. This group of leading teachers is not only encouraged to remain in the profession[18], but their skills are tapped and their energy harnessed as they serve their fellow teachers. Promoting the profession of teaching is a critical national need, and worthy of an investment in a national infrastructure.

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[16] National Writing Project & Nagin, C. (2003). *Because Writing Matters: Improving Student Writing in Our Schools*. San Francisco: Jossey Bass.

[17] National Writing Project. (2008). *Writing Project Professional Development for Teachers Yields Gains in Student Writing Achievement*. Retrieved December 3, 2008, from http://www.nwp.org/cs/public/print/resource/2668.

[18] The NWP's Legacy Study reveals that 98% of NWP teachers remain in education throughout their careers; 72% of NWP teacher-consultants continue working in education after their formal retirement. These and other results were prepared for a congressional briefing on January 24, 2008. See National Writing Project. (2008). *Assessing the Long-Term Impact of a Professional Support Community for Teachers: The Case of the National Writing Project.* Retrieved December 3, 2008, from http://www.nwp.org/cs/public/print/resource/2561.

A healthy and productive educational system, like a well-functioning transportation system, is a national priority and worthy of an infrastructure investment at the national level. The NWP can provide evidence that the investment made in its network translates "downstream" to the work of its sites, to a stronger teaching profession, to improved teaching in classrooms, and ultimately to improved student writing skills. Showing downstream results is an important criteria for assessing the value of all national infrastructure investments, but there are many other important criteria to be met as well.

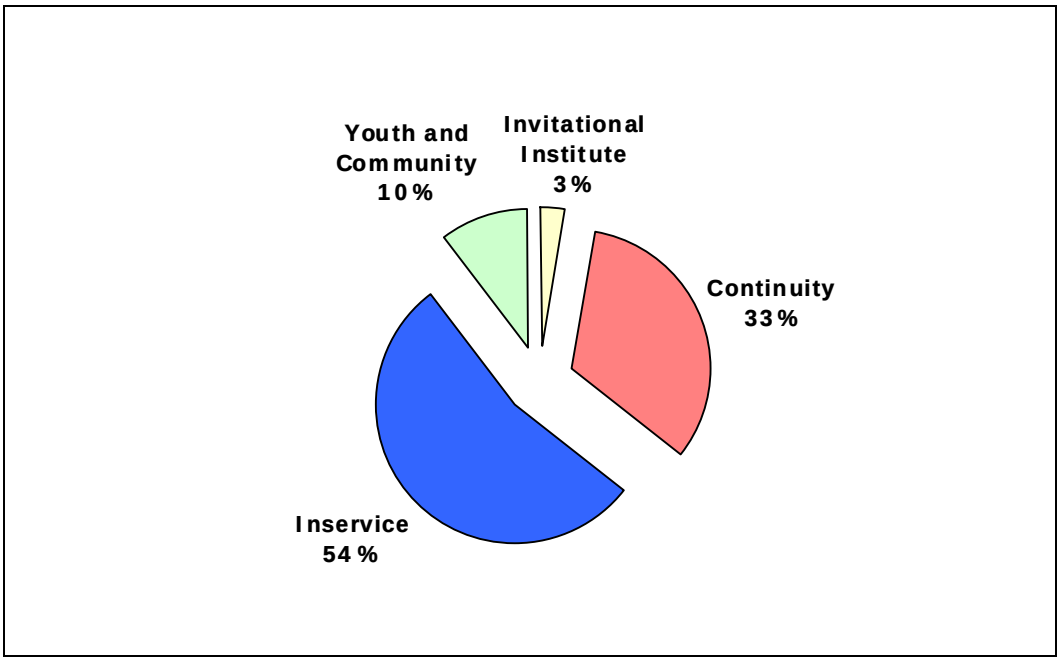
National Infrastructure: Supporting and empowering a wide array of national, regional and local activities

It is the function of infrastructure to provide foundational capacities that enable national, regional and local services. The nation's electric power infrastructure (power plants and transmission lines) provides local communities with electrical power service enabling millions of everyday activities. The nation's aviation infrastructure makes possible national, regional and local aviation activity that facilitates people all over the country in traveling where they wish to go.

Thus, a primary criteria for judging any investment made in national infrastructure is the degree to which that infrastructure is able to provide services that are both needed by and important to the local communities that are served. During the five-year period from 2002 to 2006, the NWP provided an average of 6,857 programs annually, with 5,924 of these programs (86%) directly serving teachers.[19] The NWP infrastructure is able to offer an array of programs that complement and support each other, as shown by the graph below.

[19] Others serve school administrators and students.

Figure 2. Types of NWP Programs Offered



Invitational Institutes comprise just 3% of all NWP programs, and yet they provide the critical support for the development of 3,000 teacher leaders each year. *Continuity programs* support the further development of the sites' teacher consultants and comprise one-third of all NWP programs. In 2006 more than 2,200 Continuity programs served over 33,000 potential teacher leaders. By developing teacher consultants and empowering them to work with their colleagues locally, the NWP infrastructure is able to offer a wide range of professional leaning experiences to nearly 100,000 teachers each year. In 2006 teacher-consultants led over 3,600 inservice programs in schools and districts in their sites' service areas. Finally, ten percent of the programming offered by NWP sites includes young writers' summer camps and other student programs. More than 700 Youth and Community programs served over 56,000 participants in 2006.[20] The NWP's work thus illustrates well one of the key aspects of a national infrastructure: that it can support a wide array of services that are complementary to each other.

THE NATIONAL SUPPORTS THE LOCAL-AND VICE-VERSA

It is important to note also that there is a mutually reinforcing relationship between the national infrastructure and each of its local components. For example, every airport in the US is supported by the national aviation system;

[20] For more detailed information of the types and nature of programs provided by the NWP, see Appendix A of this document.

and, at the same time, each airport that is added extends and strengthens the overall system. In the same way each NWP local site is greatly empowered by the support offered by the national NWP network; and each site that is added, in turn, strengthens that network. The support of the network to local sites is critical; indeed most NWP sites would not exist and could not do the work they do without the strong assistance of the national network. Even beyond providing financial support, the NWP network helps sites with leadership development, program design, and the development of relationships with schools, districts and state agencies. At the same time that local sites are nourished by the network, the network in turn is greatly strengthened by the contributions of each of its sites.

National Infrastructure: Providing services at a national scale-and sustaining a structure that allows for changes in scale

To be successful a national infrastructure must extend across the county and also be large enough that it can provide reliable, consistent services for thousands of communities and millions of people. Such infrastructures take time and sustained work to develop. The NWP is the largest (and oldest) K-12 professional development system in the US Growing itself over thirty-five years, the NWP is now the nation's only professional development system capable of working at a national scale, and the current NWP infrastructure is now capable of serving a significant number of the nation's teachers and students. There is at least one NWP site in every state, and currently 80% of the nation's teachers live within the geographic service area of an NWP site.

The Geographical Coverage Of The NWP

	In the U.S.	In NWP Service Area
Counties	3,148	2,025 (64%)
Districts	14,166	12,781 (90%)
Schools	97,382	77,853 (80%)
Students	49.2 million	41.5 million (88%)
Teachers	3.2 million	2.5 million (78%)

Recent data show the NWP annually serving approximately one out of every nine teachers of writing at the secondary level, and one out every 30 elementary school teachers. Because it provides services year after year, hundreds of thousands of educators currently teaching in US schools have been involved with the NWP. Using some conservative assumptions, we estimate that one out

of every three students in the US is in the classroom of a teacher who at some point in their career has participated in an NWP activity.[21]

SCALING UP AND DOWN

A national infrastructure must also be scalable, i.e., capable of expanding or contracting and changing its range of services as conditions dictate. The US aviation infrastructure is large enough to serve the nation as a whole. In addition, it is also capable of adding on or closing down runways or airports as needed. It is an open scale-free network[22] with relatively low thresholds of entry and exit, allowing local airports to come and go as conditions warrant. The system is of national scale, but also scalable. The same is true of the National Writing Project.

Many of the educational projects we at Inverness Research study are not scalable. They work well in their immediate locale, but the structure of their work and the capacities they possess do not allow for easily scaling up (or down). Because it is composed of a centralized unitary network, the NWP is easily capable of scaling up (or down) as needed.

There are two ways that NWP can scale its work up and thereby increase its services to teachers. One way is to increase the total number of NWP sites. The other way is to increase the capacity of existing sites so that they can serve more teachers and/or provide more hours of service. (This is analogous to a retail chain growing itself by increasing the number of stores and/or increasing the same-store sales each year.)

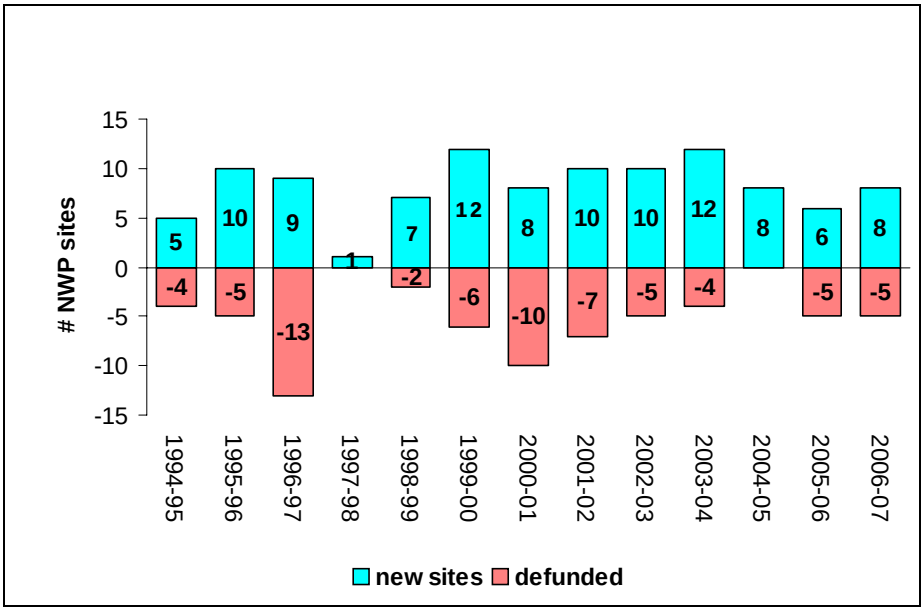
Every year for the past thirteen years for which we have records, an average of eight new sites have been added to the NWP network. (Also, it is important to note that as part of its quality control efforts, the NWP network has de-funded sites at an average rate of five sites per year over the same period of time.) This

[21] More than 92,000 individual teachers are served year after year, based on data gathered from NWP sites in 04-05, 05-06, 06-07. Over three years there are, thus, 276,000 NWP teachers in the classroom, each serving 60 students each year on average. Thus there are 16 million students in the classrooms of a teacher who has participated with the NWP. Thus, conservatively, roughly one out of every three students in the US is in a classroom of a teacher who has participated with the NWP (16m / 49m students). (This document also reported 1.049M secondary teachers, 23.9% of whom are language arts teachers.) See US Department of Education. (1998). *Digest of Educational Statistics 1998, Chapter 2 (quoting NEA Status of the American Public School Teacher 1995-96).* Retrieved December 3, 2008, from http://nces.ed.gov/pubs2001/digest/dt065.html.

[22] Barabasi, A. & Boraneau, E. (2003, April 14). Scale Free Networks. *Scientific American*. Retrieved December 3, 2008, from http://www.sciam.com/article.cfm?id=scale-free-networks.

has led to an average annual net growth rate of three sites per year over the thirteen-year period. (This growth rate has accelerated in the last five years to an average rate of five sites per year.)

Figure 3. Sites Added and De-funded, 1994-2007



SCALING UP THE WORK OF LOCAL NWP SITES

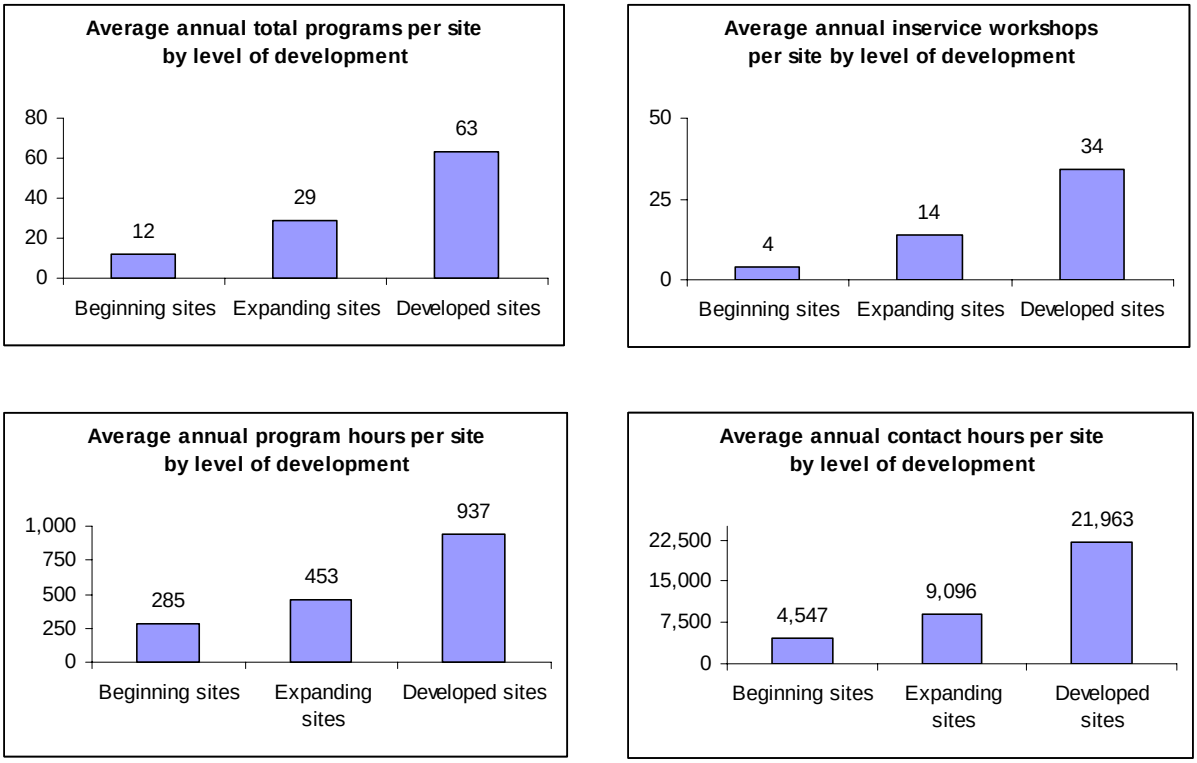
It is a critical part of the NWP model that individual sites also grow themselves, further developing their internal capacity with the result that they can provide more services as they grow.

If one clusters the NWP sites into groups that reflect their relative maturity and level of development,[23] we can observe the advantages that come from growing sites over a long period of time. We have clustered the NWP sites into three groups of different developmental levels (Beginning, Expanding, and

[23] The level of development of a site is correlated with but not exactly the same as the actual age of a site. Beginning sites have an initial Invitational Institute in place, with developing continuity and inservice programs. Expanding sites offer a substantial core program, including the annual Invitational Institute, continuity programs that support teacher leadership, significant summer and academic year inservice programs, with programs covering much of the region geographically. Developed sites have a well-developed Invitational Institute, a well-defined and supported teacher professional development with active teacher leadership, multiple and extensive teacher-led programs offered year-round, geographic coverage of the region, and a high capacity to respond to new opportunities. Similar data for sites by age is shown in Appendix B of this document.

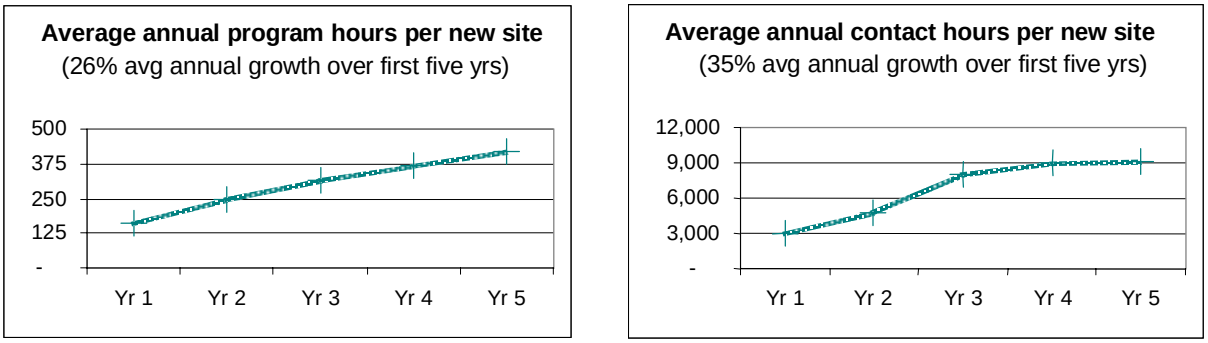
Developed). Our analysis shows that Developed sites do far more work than sites that are Beginning or Expanding. Developed sites (which represent 29% of all NWP sites) are responsible for far more than half of all NWP programs, contact-hours and participants served.

Figure 4. Average Annual Amounts of Various Services Offered by NWP Sites, by Level of Development



Additionally, as new sites grow from their first to their fifth year, they expand their service capability by more than twenty-five percent each year.

Figure 5. Growth Rate Of Service Capability of New NWP Sites

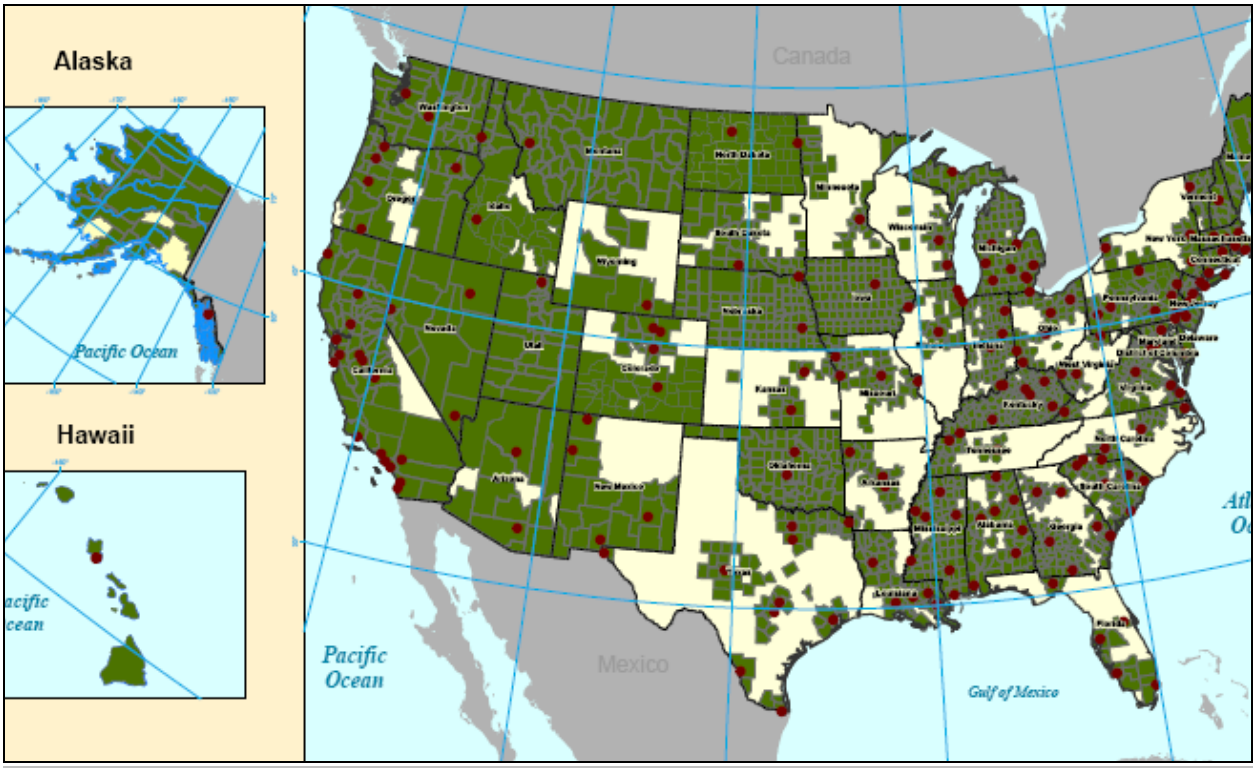


National Infrastructure: Providing services in ways that are equitable both in terms of geography and the people served

National infrastructure requires significant investment by the federal government and other public agencies. Consequently, the services offered by publicly-funded infrastructure should be designed to be easily and equitably accessible. It is important to note that accessibility is multi-dimensional and involves geographic, economic, political and technical dimensions. Ideally, a national public infrastructure is able to offer all communities, and all members of the community, easy and equal access to its services. An electrical, water or transportation system that is accessible to just some communities, or just some sub-groups within the community, is not truly a national infrastructure.

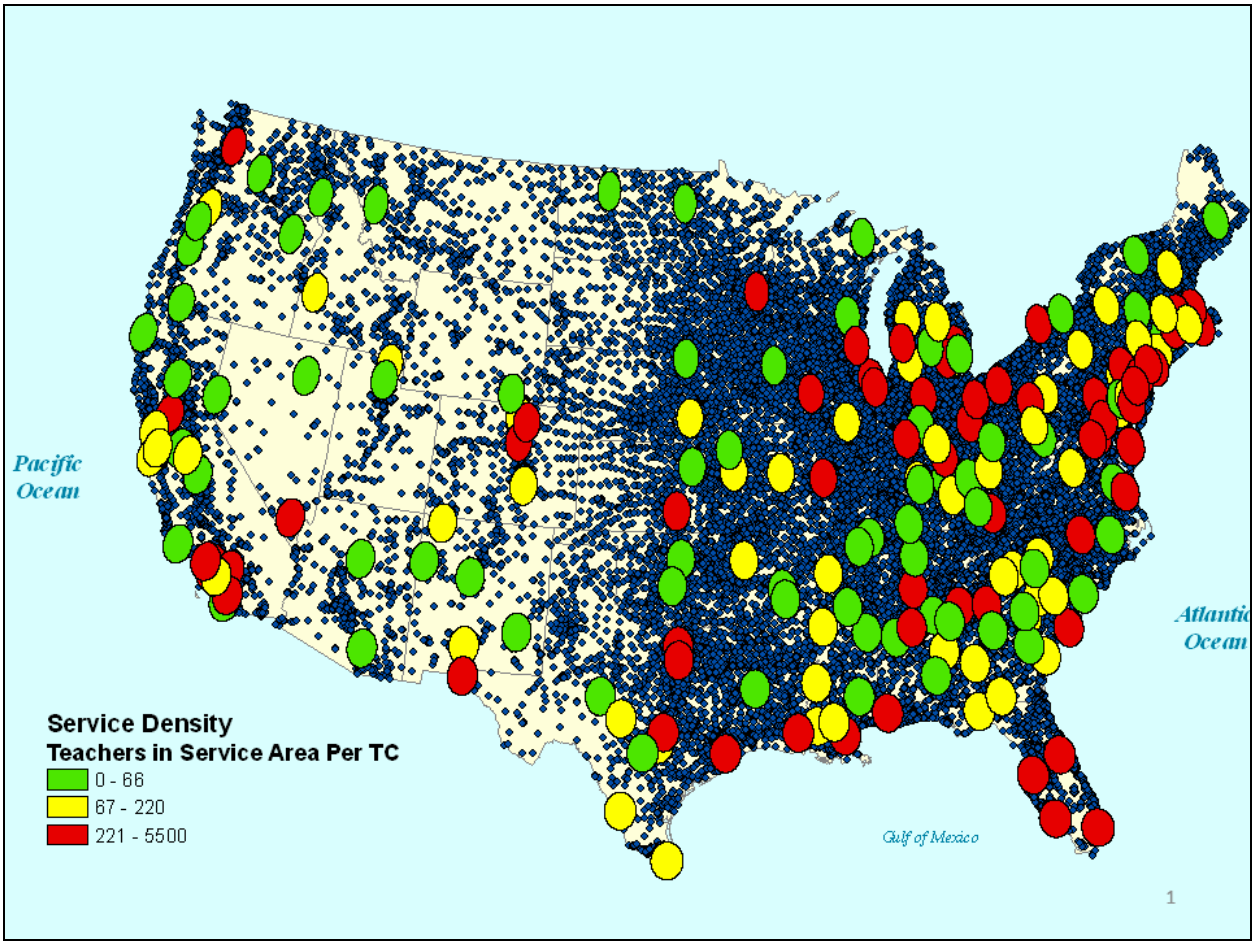
The green areas in the map below show the current service area of the two hundred NWP sites now operating in the United States.

Figure 6. Current Service Area of NWP Sites



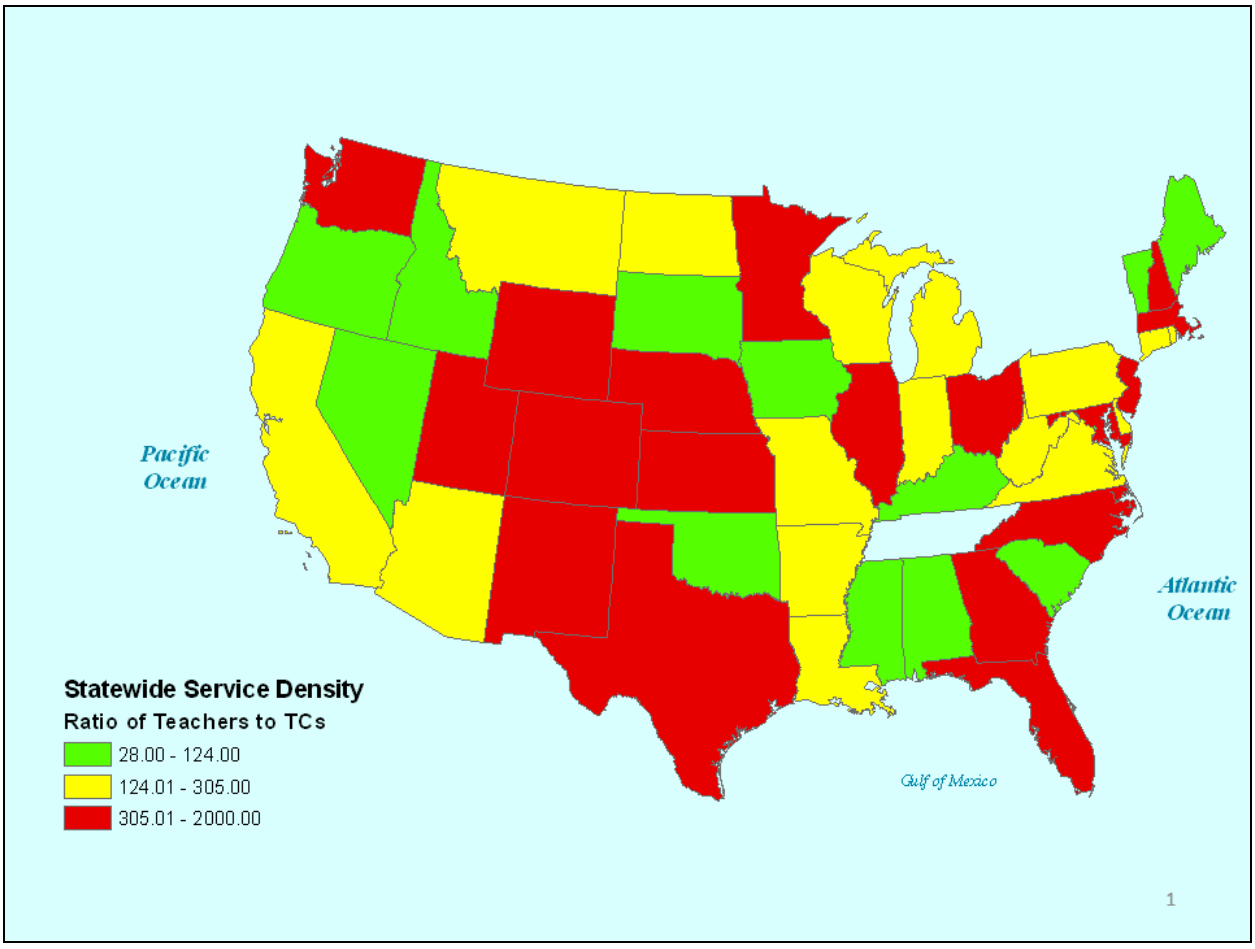
The map shown below illustrates the relative availability of NWP teacher consultants to serve their colleagues. (It displays the number of teachers for each NWP Teacher Consultant in areas within a fifty-mile radius of each site.)

Figure 7. Number of Teachers for Each NWP Teacher Consultant, within a Fifty-Mile Radius of Each Site



The map shown below displays the number of teachers for each NWP Teacher Consultant by state. *(Data for New York and Tennessee were not available).*

Figure 8. Number of Teachers for Each NWP Teacher Consultant by State



Collectively these data show that the NWP is a growing infrastructure that, while it has broad reach, does not yet have the full capacity to provide equal accessibility for all the nation's teachers. (For more details on the NWP's service to teachers see Appendix C.) It is clear that the NWP still needs to grow its infrastructure: some rural teachers do not have geographical access to an NWP site, and some urban teachers may find access limited simply by the large numbers of schools and teachers in their local site's service area. But to a great extent the NWP network is positioning sites in such a way that it is possible in the near future for all US teachers to have equal access to its professional development offerings.

EQUITABLE SERVICE TO DIFFERENT GROUPS OF TEACHERS AND STUDENTS

Access to infrastructure should be not only geographically equitable but also equitable in terms of ethnicity, economic status and race. The statistics of actual usage is the ultimate measure of the degree to which an investment in infrastructure brings equitable returns to the communities it is meant to serve.

The data we have gathered over the past 14 years confirms the proposition that the NWP infrastructure is currently serving US teachers on an equitable basis. That is, in terms of the schools and teachers who participate in NWP events, all ethnic groups are well represented. Compared to national averages, the network is proportionally serving slightly more of those teachers who work in urban areas, and those teachers who teach students of color. Other data, drawn from our annual surveys, include the following:

- The pool of leadership candidates who attend the Invitational Institutes is slightly more ethnically diverse (19% teachers of color) when compared with the national teaching force (17% teachers of color).

- 54% of the schools that are served by the NWP (through the Summer Invitational Institutes, inservice programs, and/or partnerships) are Title I eligible (compared to 55% of schools nationwide).

- 27% of the schools that NWP Summer Invitational Institute's participants teach in are located in urban areas (compared to 26% of schools nationwide).

- Of the 181,000 students taught daily by teachers who attended the 2007 NWP Summer Invitational Institutes, 45% are students of color (compared to 43% of the student population nationwide).

By these measures it is fair to say the NWP infrastructure is meeting the criteria of providing equitable accessibility, and the actual usage of the infrastructure also appears to be broadly equitable.

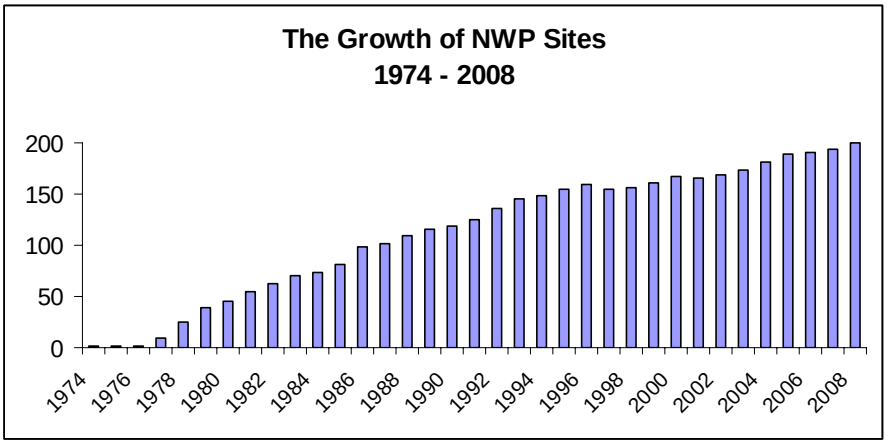
National Infrastructure: Allowing for the cumulative development of capacity and continuing expansion of service

Investments made in infrastructure development and the expenditures made on short-term projects differ in that the former leads to steadily growing capacity for ongoing improvement work. An expenditure on a project may result in a lot of activity, but the capacity of the project typically remains static over the course of the project lifetime. Investments in infrastructure, by contrast, are

explicitly designed to produce "capital" that can be used in future production, and thus the capacity of the infrastructure deliberately grows over time.

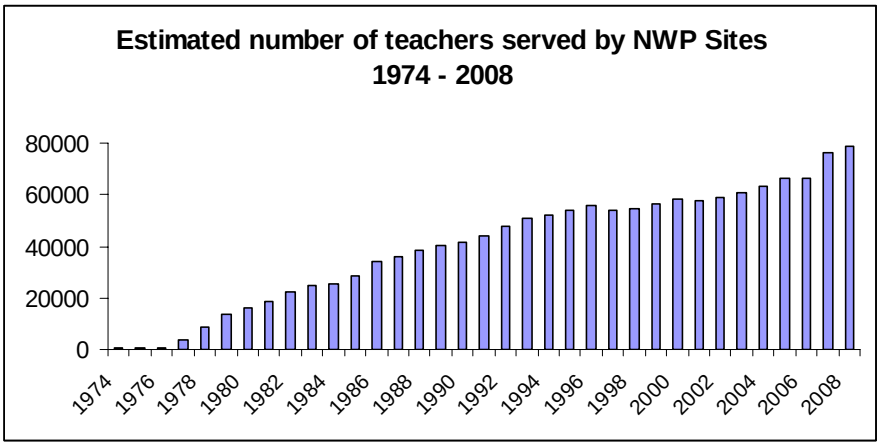
The chart below shows how steady investment has provided for ongoing growth of the NWP network over a thirty-five year period.

Figure 9. Growth of the NWP Network of Sites



An estimated 1.5 million teachers have participated since 1974[24]:

Figure 10. Number of teachers served by NWP Network of Sites



[24] We used a per site median of 350 individual educators per year, based on data gathered between 1994 and 2006, and multiplied this by the number of sites for each year. For 2007 and 2008, we used a higher median of 395, based on data gathered. Thus the cumulative total from 1974 to 2008 is estimated at 1.4m. An estimate based on per site average, instead of the median (the average is 500), would produce a total of 2.0m. Thus we estimate conservatively at 1.5m.

Growth of capacity within the NWP, it is to be noted again, has happened in three different but mutually supportive ways. First, the total number of NWP sites has grown; second, the capacity and productivity of individual sites has increased over time; and, third, the capacity of the network organization has grown steadily. In this way the investments made in the NWP are cumulative in nature; the network grows itself and the individual sites mature with the combined result that the NWP is ever-increasing in its capacity to provide more services.

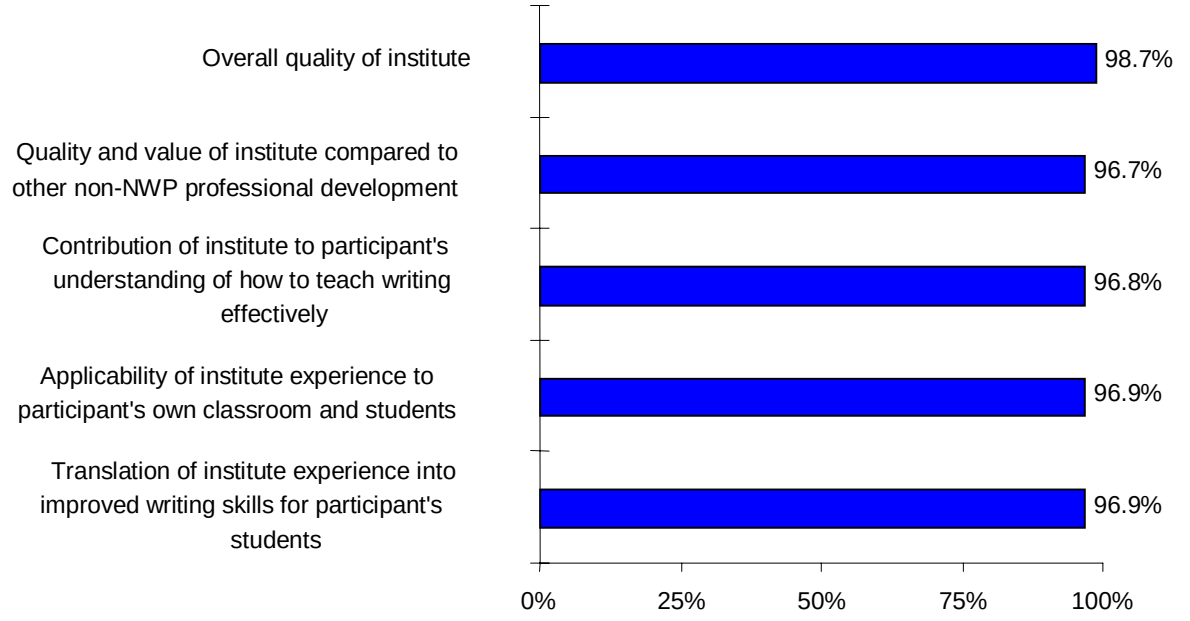
National Infrastructure: Providing services that are of high quality and thus trusted and used

Clearly national infrastructure must be of high quality. Infrastructure is the foundation upon which we live our lives. Reliability and trust are critical aspects of infrastructure value. Imagine the value of a bridge that is not trusted, airlines that are questioned as to safety, water that is doubtful as to its quality. Infrastructure must function continuously at a steady level of quality so that reliability is assured. Once infrastructure loses the public trust, it loses much of its value.

Our systematic surveying of NWP participants over the past decade has provided us with longitudinal data on the quality and benefits of NWP services offered each year. Results show that teachers consistently rate the quality of the NWP professional development very highly, and that they also highly value what they have learned from the NWP[25]. Participants also report to us that they have put their NWP learning to good use in their own classrooms. The data shown below help to verify that NWP institutes are perceived to be of high quality and bring real value to the teachers who participate in them.

[25] See Stokes. L. & Inverness Research Inc. (2008). *Teachers' Assessments Of Professional Development Quality, Value, And Benefits: Results From Seven Annual Surveys Of Participants In National Writing Project Summer Institutes*. Retrieved December 3, 2008, from http://www.inverness-research.org/abstracts/ab2008-03_Rpt-nwp-doe-survey-results.html.

Figure 11. Summer institute survey: Seven-year overall ratings of institute quality and value

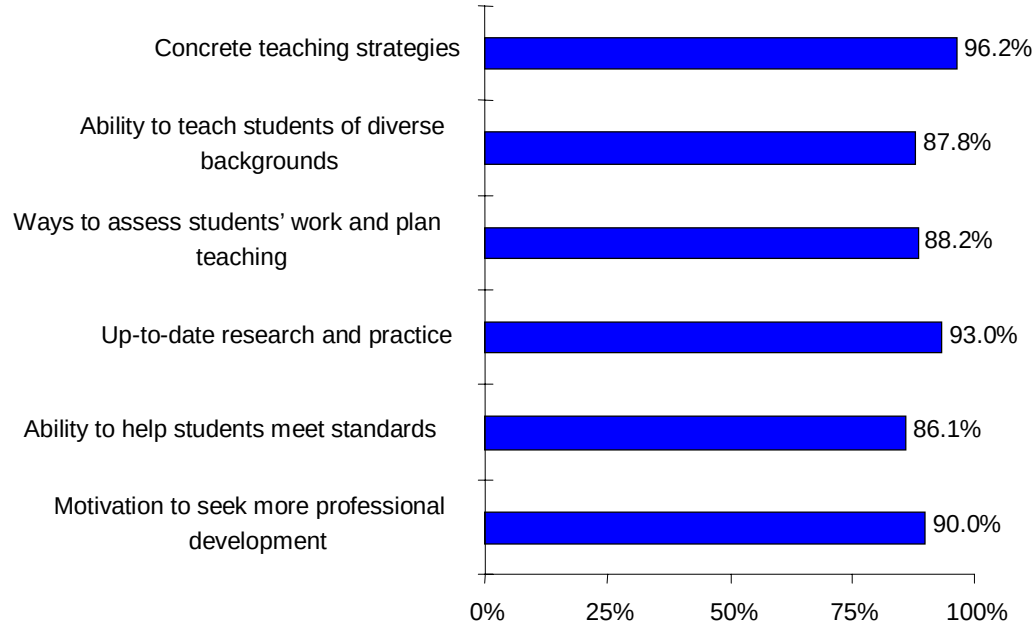


(Percentage of respondents rating the item with a "4" or "5" on a five point scale)

ONE YEAR-LATER SURVEY

Each year, at the end of the academic year following their participation in an Invitational Institute, we ask institute participants to complete a survey about the ways in which their summer institute experiences have been of use to them in their classrooms. A great majority of respondents find that their experience in the NWP has expanded their repertoires of classroom practice, enhanced their professional knowledge, and strengthened their ability to serve their students. Over seven years, the very great majority of respondents found the institute to be beneficial in multiple ways that are important to their evolution as professional leaders.

Figure 12. Follow-up survey: Seven-year overall assessment of benefits to teachers



(Percentage of respondents rating the item with a "4" or "5" on a five point scale)

These results suggest strongly that the services offered by the NWP national infrastructure are seen to be high quality, trusted, and useful in helping teachers improve their practices and address the challenges they face in their classrooms.

National Infrastructure: Engineered to be robust, connective, and flexible

Infrastructure must be robust as well as reliable. Robustness implies that the infrastructure has the ability to withstand stresses from changes in external conditions. A system is said to be "robust" if it is capable of coping well with shifts (sometimes unpredictable ones) in its operating environment with minimal damage, alteration or loss of functionality. Because conditions are unpredictable, infrastructure is typically over-engineered, built to be strong, long-lasting and able to withstand considerable usage. Highways and bridges that easily erode, that can bear only minimal loads, and that last only a few years are not a good investment. Robustness of infrastructure comes from good engineering, quality control and having enough redundancy so that perturbations or failure in one part of the system do not affect the whole system.

In this sense the NWP is a well-engineered and robust network. The network has operated continuously for nearly thirty-five years in an educational environment that has endured changes and created stresses. The NWP network has shown has exhibited multiple sources of robustness. One source is the depth of experienced and strategic leadership at both the national and site levels. Unlike many local short-term projects, the health of the NWP infrastructure does not depend on any one individual. NWP sites and the network as a whole have built in self-reinforcement by continually generating, nurturing, and also distributing leadership. The turnover rate of leadership is low: NWP site directors and co-directors have an average of 10 years experience with the Project, and close to 6 years in their director/co-director roles.[26] A similar continuity of leadership exists at the national level.[27]

There is redundancy not only of human expertise but also of sub-structures. The NWP has carefully engineered, over time, a web of urban and rural networks, national interest groups, special taskforces, state networks, advisory boards, and review committees that all reinforce the structural strength of the NWP infrastructure. The NWP "model"—which includes shared modes of working and common structures (such as the Invitational Institute)—under-girds and continually reinforces the overall quality and robustness of the network. Additional robustness is to be found in the collective knowledge and common history that the network has accumulated, as well as in the shared norms and values that carry the work of the project through large shifts in external educational policies and priorities.[28]

CONNECTIVE

Good infrastructure creates connections. Good infrastructure is like a well-woven fabric whose strength comes from the connections of thousands of different threads. Clearly, an interstate highway system, a rail system, and an air transportation system all help to create a myriad of connections that greatly

[26] From 2005-06 data.

[27] In January 2008, the NWP Board of Directors appointed only the third Executive Director in the NWP's 34-year-history. Three senior members of the national leadership team have more than two decades' experience with the NWP.

[28] For detailed accounts of the NWP's structural strength and strong normative culture, see: 1) Stokes L. (Forthcoming March 2009). The National Writing Project: Anatomy of an improvement infrastructure. In Coburn, C. E., & Stein, M.K., (Eds.). *Research and practice in education: Building alliances, bridging the divide.* New York: Rowman & Littlefield Publishing Group. 2) Heenan B., Houghton, N., & Inverness Research. (2006.) *The National Writing Project's New Teacher Initiative: A Study of Outcomes, Design, and Core Values*. Retrieved December 3, 2008, from http://www.inverness-research.org/abstracts/ab2006-03_rpt_NWP-NTIreport.html. 3) Lieberman, L. & Wood, D.R. (2003). *Inside the National Writing Project: Connecting Network Learning and Classroom Teaching*. New York: Teachers College Press.

strengthen the capacity of people to engage in commerce and pursue the normal tasks of daily life.

The NWP in a similar way consists of thousands of threads and connections. The NWP infrastructure provides for an intellectual and social fabric created by the connections among sites, between universities and school districts, and between the NWP community and other improvement communities. NWP sites have many different forms of working relationships with districts and schools; they also work with community organizations such as museums, libraries, arts organizations, and local and state literacy councils. Several states both provide support for and draw upon the NWP for help in implementing state reform initiatives; state level NWP networks are important infrastructures within, for example, California, Mississippi, and Kentucky.[29] In all these ways the NWP infrastructure greatly facilitates the making of personal and institutional connections that are highly generative of the work needed to improve education.

Flexibility

Good infrastructure provides a foundation of support for varied activities in multiple domains, allowing for flexible usage. Investments made in dams, for example, can help generate electricity, provide irrigation water, create recreation areas, and help with flood control.

The NWP infrastructure is similarly able to support many forms of leadership work and multiple activities that are tailored to a wide range of local policy and community contexts. These include the Summer Institutes and workshops described above, but also more customized partnerships with local schools, districts, and community organizations. NWP sites also engage in improving writing instruction in local colleges and universities. Contributions of the NWP are also evident beyond NWP-sponsored events: NWP teacher consultants—who are typically full- or part-time practicing teachers—work not only for their local NWP sites, but they also assume leadership roles in many other domains, including positions in local school, district, state, and national professional organizations.[30]

[29] Stokes, L. (2005). *Taking on the real struggles of teaching: A study of the National Writing Project as an infrastructure for building practitioner knowledge*. Retrieved December 3, 2008, from http://www.nwp.org/cs/public/print/resource/2451.

[30] See results of the NWP legacy study in National Writing Project's (2008) *Assessing the Long-term Impact of a Professional Support Community for Teachers: The Case of the National Writing Project*. Retrieved December 3, 2008, from http://www.nwp.org/cs/public/print/resource/2561.

Flexibility has also enabled the NWP to evolve its network so that it is responsive to ever-changing educational demands and political environments. For example, federal education policies have required the NWP to provide supportive functions in a world dominated at the federal level by the No Child Left Behind legislation[31] and at the state and local levels by increasing numbers of policy initiatives. The nation's demographics have also changed, and the NWP has adapted its approaches in a world where there are many areas with large numbers of ESL students and where minority populations have become the majority. Economics have changed, and the NWP has had to find a way to provide professional development in districts and schools that have less discretionary funding for such services.

Through the creation of special initiatives—often involving collaborations with other educational groups and foundations—the NWP has proven capable of responding to these changing environmental demands and conditions. The California Writing Project's Focus on Standards project enabled teachers to study and interpret state standards[32]. The NWP English Language Learners Network (a sub-network within the broader NWP network) has been a resource for over 10 years for the growing number of teachers who educate large numbers of English learners. The NWP's New Teacher Initiative was a response to national concern about teacher retention and the special needs of new teachers entering the profession. [33] The NWP's Reading Initiative was created in the early-2000's in response to NCLB interest in promoting literacy; the NWP wanted to expand its work in linking writing and reading for non-reading adolescents. The Technology Initiative was created in 2005 out of the need to help teachers develop students' writing and literacy in a global communication environment increasingly reliant upon digital technologies and the Internet. [34]

[31] The No Child Left Behind Act of 2001 (Public Law 107-110), commonly known as NCLB, is a US federal law signed on January 8, 2002 that reauthorizes a number of federal programs aiming to improve the performance of primary and secondary schools by increasing the standards of accountability for states, school districts and schools; it also provides parents more flexibility in choosing which schools their children will attend. The text of the law can be found on the Department of Education website http://www.ed.gov/policy/elsec/leg/esea02/index.html.

[32] See Stokes. L., Heenan, B., St. John, M. & Inverness Research. (2002). *Teachers Inquiring into Standards, Teaching, and Learning: Lessons Learned from the National Writing Project's Focus On Standards* Project. Retrieved December 3, 2008, from http://www.inverness-research.org/abstracts/ab2002-05_Rpt_NWP-FOS_LessLrned.html.

[33] See Heenan B., Houghton, N., & Inverness Research. (2006.) *The National Writing Project's New Teacher Initiative: A Study of Outcomes, Design, and Core Values*. Retrieved December 3, 2008, from http://www.inverness-research.org/abstracts/ab2006-03_rpt_NWP-NTIreport.html.

[34] See description of the NWP's Technology Initiative at http://www.nwp.org/cs/public/print/programs/ti, and Reading Initiative at

(footnote continued)

Very recently, the NWP collaborated with the national Reading is Fundamental project and the College Board's National Commission on Writing on a bilingual English-Spanish book for teachers, parents, and students; as well as with Google on the project *Writing Our Future: Letters to the Next President*, which involved thousands of students from all 50 states.[35]

The NWP infrastructure is sound enough to provide support for the operation, maintenance, and growth of all its sites. Just as importantly, it is also flexible enough to adapt to changing conditions and to provide support for a wide array of individual work and programmatic initiatives that can contribute more broadly to the improvement of education.

National Infrastructure: Achieving economic viability by being highly cost-effective and being supported by multiple sources

It goes without saying that national infrastructure should be as cost effective as possible. Infrastructure investments are by their nature often very expensive, but the cost can be amortized over many years and over a large service region. Cost-efficiency comes about through a mixture of thoughtful design, strategic capital expenditures, and ongoing operational efficiency.

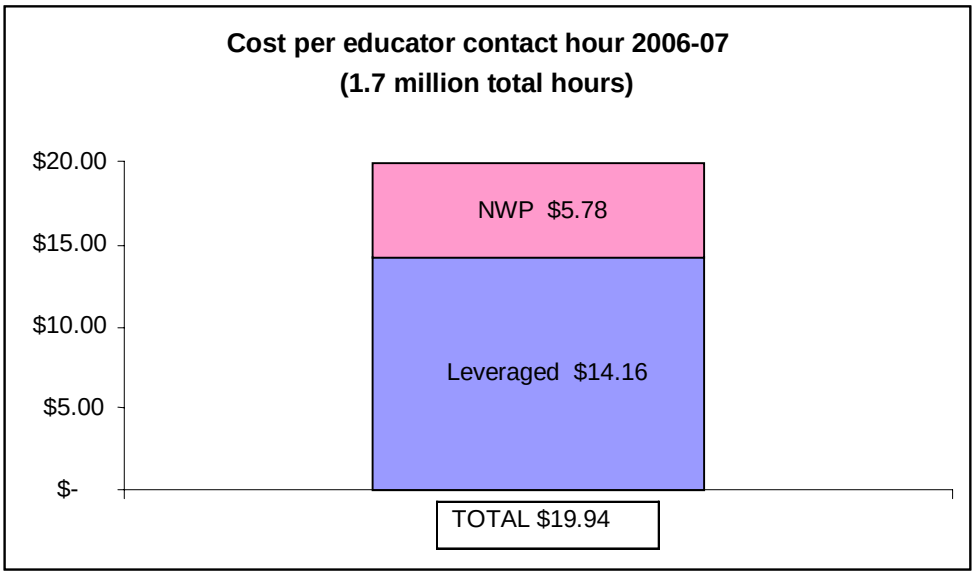
National infrastructure allows for significant economies of scale. The current annual federal investment in the National Writing Project provides funding for the development and ongoing operation of 200 different professional development sites. In this way the cost of development, administration, and evaluation are shared. The costs of developing and supporting site leadership are also shared. The costs of creating and distributing knowledge are amortized across all two hundred sites. Clearly there are real economic advantages to having one support system for 200 professional development sites, as opposed to having each site seek its own funding, evaluation, professional supports, and so on.

http://www.nwp.org/cs/public/print/programs/nri, as well as the many publications related to these initiatives.

[35] See www.nwp.org for information about these and other initiatives and projects.

As a result of these economies of scale, the NWP is able to provide professional development to teachers at a remarkably low cost. The average cost to provide one hour of teacher professional development is $19.94. The federal portion of this cost is only $5.78. Other federal investments in professional development are much more costly.[36]

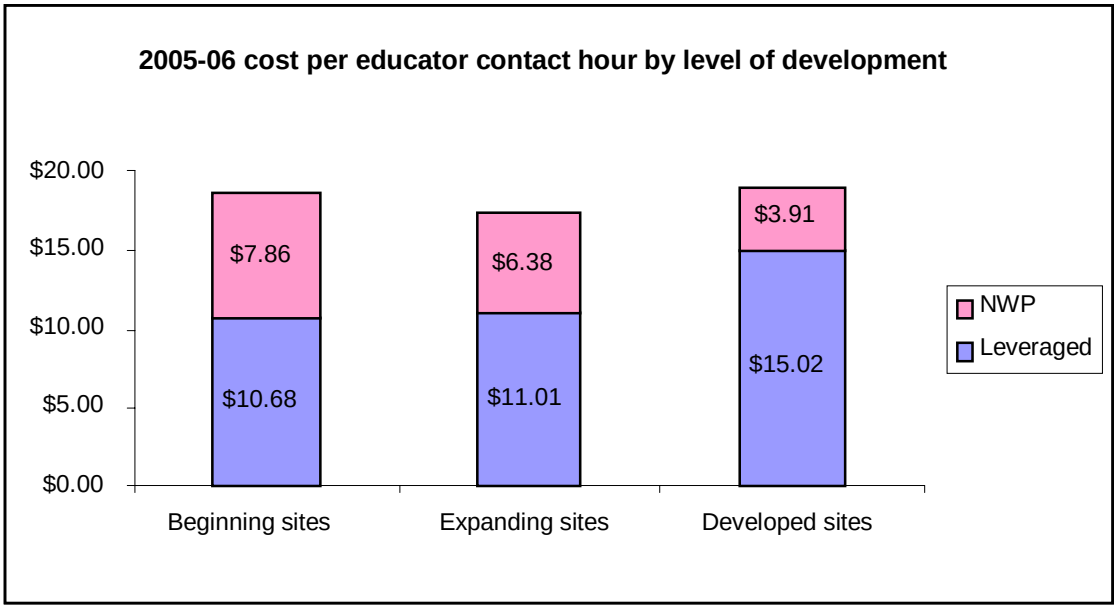
Figure 13. Cost per educator contact hour, 2006-2007



[36] For example, the NSF budgeted approximately $30 per hour for its Local Systemic Change initiative.

As sites grow, the federal cost per contact hour shrinks. In 2005-06, the federal cost per contact hour for the most developed sites was only $3.91.

Figure 14. Cost per educator contact hour by level of development, 2005-2006



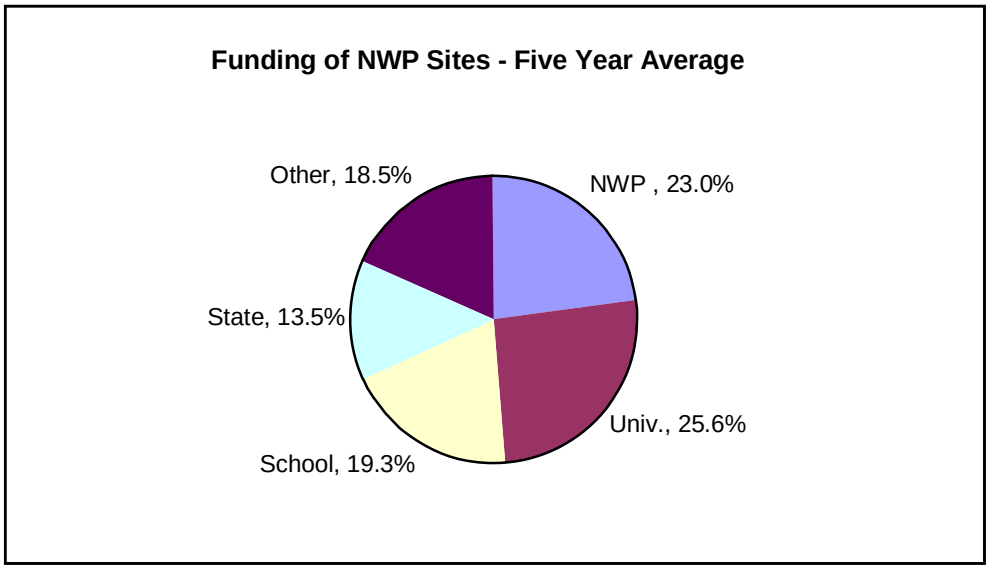
Economic Viability

Infrastructure requires initial capital investment and then ongoing expenditures for operation, maintenance and upgrading. In this sense, infrastructures are more expensive, in the short term, than projects. Consequently, national infrastructure should have a financial base that is sound, diversified and sustainable over the long-term. Roads, electrical power grids, and water systems are strongest when they are jointly funded by national, state and local revenue sources as well as by those who use the services provided. This diversification not only assures a more solid funding base but it also assures more shared ownership and interest in maintaining the infrastructure.[37]

[37] According to the CSIS's *Guiding Principles for Strengthening America's Infrastructure*: "The division of infrastructure costs is too often dictated by set formulas that fail to reflect project risk or use. Users should pay a greater portion of infrastructure costs; the extent to which users are prepared to pay for the services they use is ultimately the best test of project viability." See Center for Strategic and International Studies. (2006, March 27). *Guiding Principles for Strengthening America's Infrastructure*. Retrieved December 3, 2008, from http://www.csis.org/media/csis/pubs/060327_infrastructure_principles.pdf.

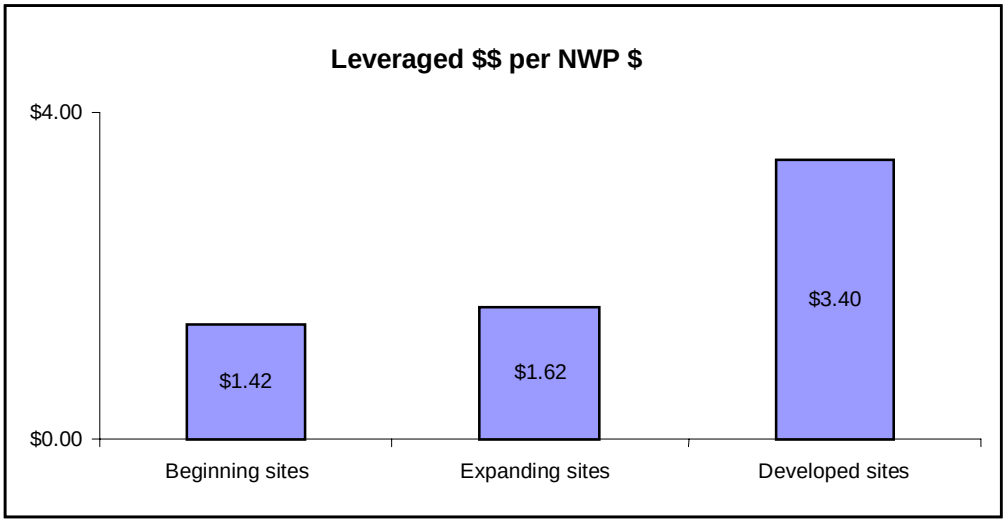
The National Writing Project is an infrastructure that is funded by federal, state, and local resources, as well as by private foundations. On average, 23% of the cost is shared by the federal grant, 13.5% by states, and 44% comes from a variety of local sources. Districts and schools pay for services that are customized to their needs; this "consumer" source of revenue accounts for 19% of the NWP total revenues.

Figure 15. Five-Year Average, Funding of NWP Sites



In 2006-07, NWP sites received about 76% of their funding from sources other than NWP. In other words, for every federal dollar they received, sites leveraged an additional $3. The most developed sites leverage more than the new and developing sites.

Figure 16. Leveraged Dollars per NWP Dollar



The long-term, steady investment of funds into national infrastructure creates a growing asset and thus provides more stability of services than does the funding of short-term projects. And stability allows for the cumulative development of the system and of the individuals who work within the system. The stability and the cumulative nature of investments in infrastructure ultimately make investments in infrastructure very cost effective over the long-term. This is also true of the NWP, which has far greater reach and yet is far less costly to operate than most short-term local professional development projects.

But there is a potential downside to this positive aspect of infrastructure. As a growing and living asset, the funding for infrastructure must be maintained. To achieve its benefits, infrastructure has to be funded in a steady, non-episodic fashion. Infrastructure needs to be maintained and enhanced in an ongoing way. There is great danger in the tendency for government to "defer maintenance" on its infrastructure investments[38] as illustrated by a recent bridge

[38] American Society of Civil Engineers. (2005). *Report Card for America's Infrastructure*. Retrieved December 3, 2008, http://www.asce.org/files/pdf/reportcard/2005_Report_Card-Full_Report.pdf.

collapse in Minneapolis. Infrastructure is not best funded by a system that requires annual appropriations, as there is a tendency to reduce or eliminate funding in a lean year. It also makes little sense to fund infrastructure for a few years and then shut off that funding. It is not possible to "skip" the funding of knowledge-based, social-networked infrastructure for a year or two, and then resume it as it was. Once lost, infrastructure is gone virtually forever.[39]

National Infrastructure: Providing mechanisms for quality control, learning, self-correction, and regeneration

This particular aspect of investing in infrastructure is perhaps the most abstract and yet at the same time one of its most important features. "Self-organization" is a term that is applied to physical and living systems; it describes the evolution of a system into an organized form in the absence of external pressures. Self-organizing systems have strength and redundancy, they evolve over time, and they have the ability to maintain and repair themselves. The NWP has a strong capacity for such self-organization.

QUALITY CONTROL

Self-organizing systems have their own mechanisms of quality control, maintenance, and self-improvement. In a sense, this means that strong infrastructure has its own internal regulatory and quality control mechanisms. For example, there are multiple ongoing mechanisms for assuring that the water systems of the US are providing the population with safe water; multiple agencies work together to make sure that air transportation is safe and that planes and facilities are well maintained; and other agencies check that roads, bridges and dams are safe and maintained.

A critical asset of the NWP is its capacity for self-organization and, in particular, quality control. The NWP infrastructure not only provides professional development services but it also expends considerable energy in maintaining and upgrading itself. This is not surprising to those who study the way the NWP works. Because it is relatively stable, and because it continues to do good work year after year, the NWP is able to attract and retain high-quality individuals to serve in leadership roles. This creates a positive feedback cycle,

[39] For this reason the US Congress has provided funds to continue the production of at least one nuclear submarine per year by the Electric Boat Company in Groton, CT. The intention is to maintain a steady investment so that the people, tools and knowledge gathered at Electric Boat are kept intact and ready to produce more submarines should they be needed. See 1) Wikipedia. Entry for General Dynamics/Electric Boat. Retrieved December 3, 2008, http://en.wikipedia.org/wiki/General_Dynamics_Electric_Boat. 2) General Dynamics/Electric Boat Company, http://www.gdeb.com/about.

where the NWP is able to attract people of high caliber and involve them in a way that represents the ideals of a professional learning community.[40]

Additionally, it is important to point out that the NWP has embedded within its network multiple quality control mechanisms. All sites are reviewed annually using a carefully designed and rigorous process. On average, 3% of sites are not refunded each year and another 5-10% are identified as needing technical assistance to remedy important deficiencies. All new NWP sites receive special assistance and director support. And the NWP supports ongoing external evaluation and research studies that continually assess the quality and value of the NWP services. In short, NWP is a strong self-organizing system that has its own internal mechanisms that support the development of strong leaders, the maintenance of quality, and the cultivation of shared values.

National Infrastructure: Providing a vehicle for making highly efficient future investments

National infrastructure also makes additional investment in public services more focused and efficient. The existence of a national unitary infrastructure allows for future investments to leverage and be leveraged by earlier investments. For example, each mile of new interstate highway that is funded both contributes to and benefits from the presence of the highways already in place.

Because the National Writing Project exists, the federal government and others who wish to fund the improvement of the teaching and learning of writing have a strong foundation in place for optimizing the value of their investments. There is no need to fund professional development sites separately, and there is no need to re-invent ways to serve teachers across the country every few years. Rather, the NWP provides a clear cost-effective channel for investing in the nation's cumulative capacity to serve teachers in an ongoing fashion. In this way, the NWP has made the field of writing instruction a more "investable" field.[41] This contrasts strongly with mathematics and science education, where many projects are funded but there is little development of lasting infrastructure that is available to do the funded improvement work. Additionally, the NWP infrastructure provides a deep reservoir of existing capacity that can be tapped for new initiatives and experiments. Because the infrastructure of sites and a model for leadership and knowledge development already existed, Senators

[40] Lieberman, A. & Wood, D. (2003). *Inside the National Writing Project: Connecting Network Learning and Classroom Teaching*. New York: Teachers College Press.
[41] Bacchetti, R., & Ehrlich, T. (Eds.). (2006). *Reconnecting Education and Foundations: Turning Good Intentions into Educational Capital*. San Francisco: Jossey Bass.

Rockefeller (D-WV) and Cochran (R-MS) chose the NWP as an arena for research and development on how best to help teachers use technology effectively in their writing instruction[42]. In short, investments in infrastructure create more capacity—and that capacity, in turn, creates more opportunity for future sound investments.

Implications Of The NWP Example: Investing In Educational Improvement Infrastructures

How we invest in education matters as much as what we invest in. Most efforts to invest in the improvement of US education have come in the form of expenditures made on short-term projects. Many of these efforts produce high quality services and resources; however, this grant-making strategy by itself is insufficient to bringing about significant and sustainable improvements in teaching and learning. What is needed, we argue, is a complementary strategy that invests money in the development of educational improvement capital, particularly in the form of coherent educational improvement infrastructures.

The key features that distinguish investments in infrastructure from the funding of short-term projects are shown below:

Funding Projects	**Investing in Improvement Infrastructures**
Finite short lifetime	Ongoing operation
Finite funding from a single source	Ongoing funding from multiple sources
Static capacity	Ever-growing capacity
Focused on achieving short-term improvement goals	Focused on building capacity and providing ongoing support services
Often focused on a single problem or issue	Focused on creating capacity to address multiple problems and issues
Focused on the activities involved in improvement	Focuses on building capacities needed to carry out improvement activities
Tries to achieve leverage through replication, sustainability, etc.	Tries to achieve leverage through learning, stability and cumulative growth

[42] Congressional Desk. (2007, March 29). *Cochran, Rockefeller Introduce National Writing Project Act*. Retrieved December 3, 2008, from http://www.americanchronicle.com/articles/23084.

The development of multiple national educational improvement infrastructures is a feasible goal. The concept is not pure theoretical speculation. There are other examples of improvement infrastructures greatly impacting the functioning of social services:

- Agriculture extension agencies now function all over the world to support farmers in improving their production and marketing methods. They have made research and innovation accessible to small rural farmers in multiple appropriate ways. The agricultural extension infrastructure is also able to help with other issues such as business planning, medical issues and education.[43]

- The British School Inspectorate System has now been operating for many decades, providing both formative and summative evaluation services for schools and other educational services. Every school in the UK goes through the inspection process and receives an official, detailed report which is made available to the public on the agency website. In addition, the inspectors have the mission of helping schools improve themselves. This government sponsored infrastructure is purely in the business of improving—and not operating—educational enterprises across the UK. [44]

For nearly fifteen years we have had the opportunity to document and assess the work of the National Writing Project, an effort that we believe comes very close to fulfilling the criteria needed to satisfy the requirements of being a national educational improvement infrastructure. The National Writing Project, we argue, provides a strong feasibility proof and a highly illuminative example that steady investment can indeed produce a national improvement infrastructure. In this case, the NWP is well positioned to improve the teaching of writing; other similar infrastructures could be developed to support the improvement of other disciplines.[45]

[43] For more information, see about Extension at Cooperative State Education, Research, and Extension Service, http://www.csrees.usda.gov/qlinks/extension.html.
[44] For more information, see about Ofsted: the Office for Standards in Education, Children's Services and Skills at http://www.ofsted.gov.uk/Ofsted-home/About-us.
[45] For years the California Subject Matter Projects, funded by the state of California, used the National Writing Project model to develop statewide networks that supported teachers in Mathematics, Science, History and Social Sciences, Foreign Languages and the Arts. For more information see http://csmp.ucop.edu.

Conditions required for building additional educational improvement infrastructures

Several pre-requisite conditions are required in order to successfully pursue the idea of developing other national improvement infrastructures. One is that there must be clarity about the need for and the benefits of investing in capacity—particularly, the capacity needed for ongoing system improvement. Most funders now demand immediate returns on their investments in the "downstream" form of enhanced student achievement. Investments in infrastructure, by their nature, are "upstream" investments, creating capacities that provide critical supports for a wide range of activities that ultimately generate many different kinds of benefits for their users. But it is inappropriate and counterproductive to demand immediate "downstream returns" from such investments[46].

A second pre-requisite is the recognition that investments in infrastructure must be steady and long-term. There is no point in making short-term or episodic investments in the development of a highway system or an electrical system. Ongoing funding is needed to assure the benefits described in this paper.

A third pre-requisite is the development of shared understanding between federal, state, and local entities as to how the infrastructure will function and be supported. In the case of the National Writing Project the federal government is supplying the funding necessary to establish, grow and operate the core functions of the infrastructure. This allows the NWP to develop itself to a point where it can offer high-quality services to states and local school systems, such that they share a significant portion of the cost of the services provided.

Currently, the U.S. educational policy system appears to be unwilling or unable to devote funds to the creation of educational improvement capital. The result is that the educational operating system in the U.S. is not capable of supporting the work needed to improve itself. Worse, without the existence of improvement infrastructures, the educational operating system becomes "un-investable," having very little capacity to use well the funds that are invested. This leads to a vicious downward spiral. The absence of capacity and the absence of investment lead to a chronically depleted and under-nourished system.

[46] Similarly one would not demand an immediate rise in Gross National Product from a long-term investment in Internet infrastructure.

In retrospect, it is not surprising that progress since the publication of *A Nation at Risk*[47] has been episodic and uneven at best. What is needed now is a sustained program of steady investment in the nation's educational improvement infrastructure. Such investment could lead to ongoing support systems that can support continuous improvement of teaching and learning in the United States. The National Writing Project provides a clear and dramatic example of effective investment in a sound improvement infrastructure, and of generating, over many years, educational improvement capital. We hope that the NWP can be seen and understood as illustrating a fundamentally different way of investing in the future of our nation and its children.

[47] US Department of Education. (1983). *A Nation at Risk: The Imperative For Educational Reform*. Retrieved December 3, 2008, from http://www.ed.gov/pubs/NatAtRisk/index.html.

Appendix A: The Scale of Work of the National Writing Project

Year	# Total Programs	# Inservice Programs	# Continuity Programs	# Youth/Com Programs	# Invitational Institutes
2001-02	6,117	3,257	1,956	715	188
2002-03	6,482	3,435	2,184	667	196
2003-04	6,871	3,765	2,204	707	195
2004-05	7,288	4,037	2,356	684	211
2005-06	7,526	3,991	2,531	798	206
5 yr avg	6,857	3,697	2,246	714	199

Year	# Total Participants*	# Inservice Participants	# Continuity Participants	# Youth/Com Participants	# Invitational Participants
2001-02	198,793	96,700	35,445	63,426	3,176
2002-03	184,030	93,227	37,390	50,199	3,214
2003-04	193,233	95,005	30,848	64,290	3,090
2004-05	193,578	106,542	31,063	52,697	3,276
2005-06	184,916	99,577	32,741	49,417	3,181
5 yr avg	190,910	98,210	33,497	56,006	3,187

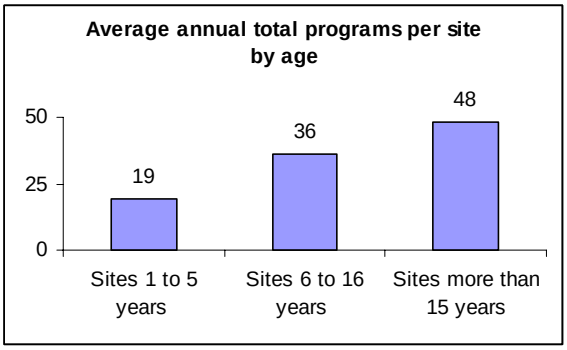
(Participants are not unique individuals. We estimate that roughly half of all teachers participate in more than one NWP program annually.)

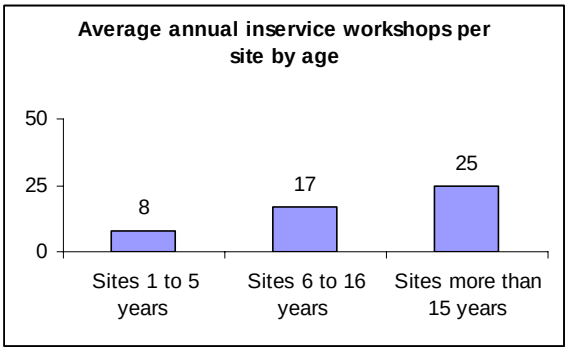
Year	# Total Program Hours	# Inservice Program Hours	# Continuity Program Hours	# Youth/Com Program Hours	# Invitational Program Hours
2001-02	101,340	39,453	27,611	12,517	21,730
2002-03	106,337	40,086	30,171	12,681	23,399
2003-04	109,371	42,366	28,322	14,983	23,700
2004-05	113,660	41,316	32,685	13,903	25,756
2005-06	113,228	44,043	30,828	13,040	25,318
5 yr avg	108,787	41,453	29,923	13,425	23,981

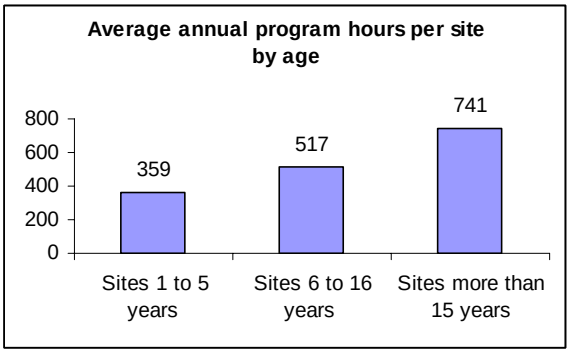
Year	# Total Contact Hours	# Inservice Contact Hours	# Continuity Contact Hours	# Youth/Com Contact Hours	# Invitational Contact Hours
2001-02	2,563,747	1,007,577	443,041	740,857	370,892
2002-03	2,544,652	945,738	441,953	773,492	383,470
2003-04	2,597,904	957,214	361,316	904,282	375,092
2004-05	2,526,335	1,021,135	366,480	736,239	402,480
2005-06	2,409,673	968,276	338,116	712,048	391,234
5 yr avg	2,528,462	979,988	390,181	773,384	384,634

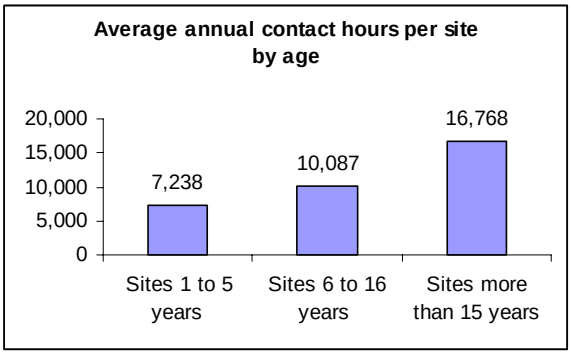
Appendix B: Program Data by Age of Site

Figure 17: Program Data by Age of Site





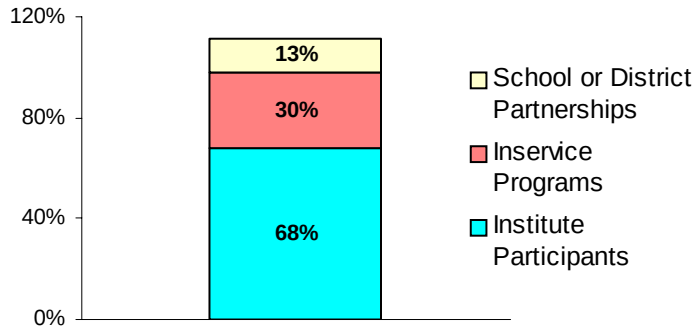




Appendix C: NWP Service to Schools and Districts

Each year, NWP programs serve almost 3,000 K-12 public schools, representing 1,700 districts in over 900 counties nationwide. Over 2.3 million students are enrolled in these schools. The schools and districts are served in a variety of ways. Over two-thirds (68%) of the schools have teachers who attend a four-week intensive summer Invitational Institute. Nearly one-third (30%) receive inservice programming, and 13% have formal long-term partnerships with sites. Schools and districts may be served by more than one type of NWP program, as illustrated below:[48]

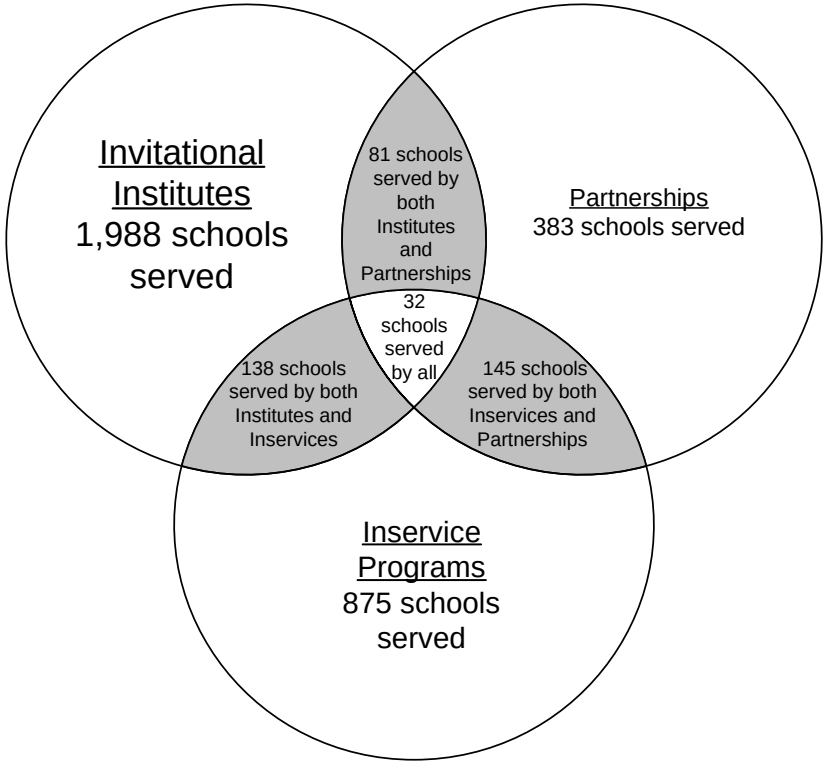
Figure 18: NWP Service to Schools and Districts



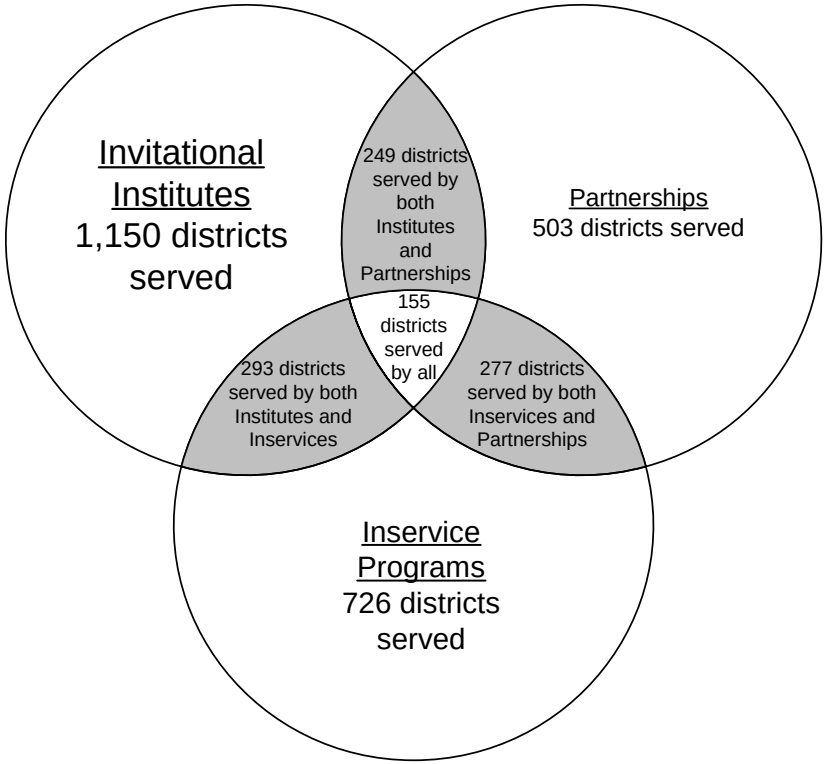
	N of sites reporting	# Counties Served	N of sites reporting	# Districts Served	N of sites reporting	# Schools Served
Institute Participants	182	674	182	1,150	182	1,988
Inservice Programs	159	482	159	726	145	875
Partnerships	140	315	140	503	88	383
Overall total (overlap)	190	902	190	1,715	190	2,914

[48] Note that the data in this section are from 2005-2006; however these numbers are consistent with those of the previous four years.

2,914 schools served through NWP programs



1,715 districts served through NWP programs *



Note: Data year for this schematic is from 2005-2006. Figures from the previous four years are similar.

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