

# BUILDING THE FOUNDATION FOR RAISING STUDENT ACHIEVEMENT: INVESTING IN AN IMPROVEMENT INFRASTRUCTURE

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## Brief Problem Statement

This policy brief suggests a new conceptualization for the structuring and financing of the state's school systems to support their continuous improvement. It presents a fundamentally different way of understanding and responding to the challenges of improving student achievement. The policy shift that is suggested in this brief is not aimed at any particular domain such as pre-service, curriculum, or assessment, nor does it draw on a specific research study or set of data. Rather, this brief is conceptual in nature, but it is also grounded in our experience of studying hundreds of educational improvement projects.

One can ask why schools don't do a better job of educating students. But it is equally important to ask why districts and schools don't do a better job of improving the education they offer their students. This policy brief argues that the reason California schools are not showing more improvement is that they lack the capacities needed to do the work required to improve themselves. They don't get better because they can't get better. And they can't get better because the whole approach to funding improvement efforts has been misconceptualized.

To understand why improvement efforts need improving, it is very important to distinguish between the task of operating an educational system and the task of improving it. The two tasks present highly related challenges, but they are not the same. Operation and improvement require different kinds of work, expertise, strategies, and resources. Confounding the two challenges, as often happens, can lead to difficulties in addressing both.

*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 simple expenditures. Infrastructure requires investment which, over the years, will provide a return, but investing in infrastructure isn't the same as spending money on day-to-day expenditures.*

Felix Rohatyn ... Speaking on the Jim Lehrer Newshour on a recent report published by the Center for Strategic and International Studies: **Guiding Principles for Strengthening America's Infrastructure**

It is important to distinguish between investment and expenditure<sup>i</sup>. Expenditures are one-time allocations of funds for services or products; expenditures pay for things that are consumed. By contrast, investments are intended to create enduring assets that will bring future returns; they produce capital that can be used in the production of other goods and services. The ability to make smart expenditures is key to operating an efficient enterprise; the ability to invest wisely in the creation of capital is critical to the continuous improvement of that enterprise.

To date the improvement of education has largely been conceptualized as an expenditure and not as an investment. As a result, the whole process of improving schools and instruction has been under-capitalized. Funding levels for improvement are almost certainly too low. More important, funding for improvement is too often short-term, episodic, and unreliable, resulting in a profusion of uncoordinated

improvement programs that do not build continuously toward improved instruction and student achievement. There are too few mechanisms (or even intentions) to use public educational funds to invest in the development of what might be called educational improvement capital<sup>iii</sup>. Just as capital investments are critical to the long-term health of industry, investments made in educational improvement capital are essential to create the foundational capacities needed to improve educational instruction and achievement.

The current level of public funding dedicated to educational improvement is quite low compared to the expenditures used to operate the system. The educational system is unwilling or unable to devote funds to the creation of educational improvement capital, and therefore the system is incapable of investing in its own future. This inevitably leads to a chronically depleted and under-nourished system. By contrast, other industries and corporations have ample resources, structures, and incentives for self-investment for continuous improvement. Microsoft, for example, spends 16% of its revenues on R&D and product innovation; pharmaceutical companies spend up to 50% of revenues on R&D.

Low levels of funding are only one aspect of the problem. A unidimensional and short-sighted approach to supporting improvement efforts is another. The expenditures in educational improvement to date have largely focused on short-term programs and projects which are aimed at ameliorating a particular problem (e.g., large class sizes, new teacher orientation); strengthening a particular dimension or domain (e.g., professional development for language arts and mathematics teachers), or pursuing a particular strategy toward system improvement (e.g., school restructuring; increased accountability). Underlying these strategies for improvement are several assumptions. One is that the problem being addressed somehow reflects a temporary situation and can be “fixed” in a relatively short time with the infusion of extra funds. Second, there is an assumption that the improvement effort, and the results that it yields, will somehow be sustained and perhaps even replicated. Third, there is often an assumption that funding alone is sufficient—that the capacity to do the funded work of improvement (e.g., provide high-quality professional development, implement challenging curriculum, mentor new teachers) already exists. In our experience of studying hundreds of programs and projects we have rarely found these assumptions to be true.

Over many years and in multiple studies our research group has analyzed and documented the capacities necessary to successfully undertake systemic improvement efforts. They include people, knowledge, structures, and tools—all working together and focused on the work of instructional improvement. Strong leadership is critical. By leadership we are speaking specifically about leadership for improvement—that is, about administrators and teachers who not only are skilled in doing their jobs, but also have the expertise, propensity, mandate and time to engage in the improvement of administration and teaching. Vision and knowledge are also critical. The vision of good teaching and learning, and the knowledge of how to orchestrate systemic change toward that vision are both essential. Similarly, it is important to evolve structures (e.g., mentors and coaches) and special tools (e.g., lesson study) that empower the work of instructional improvement.

Few school systems currently have the capacities described above. They lack the staff, knowledge, structures or tools to carry out continuous improvement efforts. They also lack the key resources of money and time to devote to improvement efforts; many districts are under extreme pressure simply to operate their systems. From time to time districts may have special funding that allows for the support of leadership positions, the creation of a shared vision, or the implementation of special programs. But once the project funding is over, these components rarely are sustained as a part of the permanent system. The educational improvement capital that is generated is temporary at best. Consequently, most districts lack most of the capacities needed to work on the dimensions of the system that most influence the nature and quality of instruction.

## **Discussion of Policy Issues, Options, and Recommendations**

### ***Introducing the Concept of the Improvement Infrastructure***

Educational improvement capital refers to the capacities necessary to generate and sustain high quality improvement activities. The constellation of those capacities, interwoven and working together, can be thought of as an “improvement infrastructure”. The improvement infrastructure concept was invented by Doug Engelbart<sup>iii</sup>, a professor emeritus at Stanford and a visionary who thinks about organizations and the improvement of organizations<sup>iv</sup>. Doug Engelbart pointed out that every organization has a capability infrastructure—that is, it has a set of supports that help people do their work. For example, in aviation the

capability infrastructure includes the airline terminals, the runways, the computer systems, and air traffic control. In education the capability infrastructure includes buildings, buses, textbooks, desks, administrators, janitors—all of which are meant to support teachers in their job of teaching students.

What Englebart recognized was that organizations also need *an improvement infrastructure*. The improvement infrastructure underlies and supports the ongoing improvement of the capability infrastructure. By constantly working to make the capability infrastructure stronger, the improvement infrastructure is critical to the quality and long-term health of an enterprise. In aviation there is a large improvement infrastructure—whole inter-connected industries that focus on basic research, new designs, maintenance and safety. In public schooling, by contrast, there is at best a weak and disconnected improvement infrastructure.

Schooling is ongoing work. Hence, the capability infrastructure that supports schooling also needs to be ongoing. But the need for continuity and for an underlying infrastructure is equally true for the work that is involved in the improvement of schooling. It is highly unrealistic and inefficient to continue to fund short-term intermittent projects with the hope that the system will be fixed “once and for all”. If schools are to be on-going enterprises, then the need for improving them will also be continuous and ongoing. And just as the work of schools requires an underlying capability infrastructure, the work of improving schools similarly needs the support of an underlying improvement infrastructure.

***The Essential Features of An Educational Improvement Infrastructure***

Investing in the educational improvement infrastructure is different than funding educational programs, even large statewide programs. Infrastructure has its own unique features and characteristics. Well-designed infrastructure of any kind empowers a wide range of other activities. Unlike short-term projects, infrastructure is more or less permanent, and its capacity increases over time. To be useful infrastructure has to be stable, robust and trusted. Infrastructure works on a large scale and is scalable up or down as needed. Public infrastructure is cost-effective, and it is usually funded by multiple sources, all of whom count on and value the services offered by the infrastructure. Good infrastructure is accessible to many different users on an equitable basis.

The infrastructure that provides electrical power across the United States is made up of connected functional components that all work together in a mutually supportive fashion (e.g., generators, transmission lines, transformers, and outlets). In the same way the educational improvement infrastructure has to be made of connected functional components that all work together as a system. In this case rather than supply electricity, the improvement infrastructure is intended to initiate, implement and sustain improvements in the key dimensions of the educational system that support instruction. For example, the improvement infrastructure for education includes the capacities needed to design and implement high quality professional development, curricular improvements, assessment procedures, policy reforms, etc.

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

<i>Funding Projects</i>	<i>Investing in Improvement Infrastructures</i>
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 single dimension of system	Often focused on multiple dimensions of system
Focuses 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

## *Creating Educational Improvement Infrastructures*

There are different ways to create improvement infrastructures. One way is to design and develop them from scratch. Probably the best example in education of the *creation de novo* of a coherent improvement infrastructure is the National Writing Project (NWP)<sup>v</sup>. For over thirty years the NWP has grown itself, establishing nearly 200 professional development sites at universities across the country. With stable and shared funding coming from the federal government, states, universities, local districts and teachers the NWP has been able to develop hundreds of expert site leaders and thousands of teacher consultants who are now serving over 100,000 teachers each year. Because it is ongoing, the NWP is cumulative in terms of building its own capacity, developing the range of services it offers, and improving its own work. Our group at Inverness Research has studied the project for many years<sup>vi</sup> and found that the NWP meets many of the key criteria that define successful infrastructure investments in terms of quantity, quality, cost effectiveness, scalability, and accessibility and equity. The fact that the structure was constant, the funding stable, the work cumulative—all these attributes make the NWP a strong improvement infrastructure for the teaching of writing across the country.

Another approach to creating improvement infrastructures is to identify and weave together existing resources so that they can operate in a mutually supportive and coherent fashion. A good example of this strategy is currently taking place at a regional level in the Bay Area in the domain of elementary science education. A consortium, initially funded by four private Foundations, is now connecting 17 science rich educational institutions (e.g., museums, universities, labs, etc.) with 9 Bay Area Counties and 148 schools districts. The idea is to create an ongoing entity that can help to build the collective capacity of the region to provide professional development and support the implementation of high-quality curriculum in elementary science. The important idea here is that this consortium is conceived as an ongoing infrastructure, not a short term project, with funding coming from multiple sources

### **RECOMMENDATIONS**

- 1) We recommend that the state reconceptualize its approach to financing educational improvement. The state needs to explicitly identify the need to invest in educational improvement infrastructures at the state, county and district levels.
- 2) The state should recognize that such infrastructures are complementary to and supportive of short-term projects and initiatives. State funding for improving education should not be construed or structured solely as a series of short-term expenditures. Rather the state needs to find ways to invest in interlinked and nested improvement infrastructures that will become an integral ongoing part of the educational system.
- 3) These improvement infrastructures must include institutions and people who reside both inside and outside the system. Universities, labs, museums and other community agencies can provide a range of supports for the work needed to improve instruction.<sup>vii</sup> But it is equally important that counties, districts and schools develop their own organizations that house and develop local improvement infrastructures<sup>viii</sup>. The combination of inside and outside organizations working together in an interconnected and mutually supportive way are critically important in making the improvement of education robust, stable and “investable”.
- 4) It is not possible or desirable to completely separate the work of developing infrastructure from the funding of the work it supports. The National Writing Project was developed by funding its work with teachers, but also by simultaneously investing in its own capacity building<sup>ix</sup>. Funding for educational improvement should thus be long-term with the dual focus of doing good work, while at the same time very deliberately building sustainable capacities.
- 5) The state should set aside on the order of 5% of all state education funding to be invested in the development of state, county and district improvement infrastructures. These funds should be separate and distinct from operating funds.
- 6) At all levels the improvement infrastructure should include institutions, agencies, and individuals who are expert in the improvement of professional development, curriculum and materials, the setting and changing of policies, the design and use of assessments, and the acquisition and use of financial resources. Ultimately, the state should develop and support strong “improvement communities”—i.e., individuals around the state who are expert at and engaged in the challenges of improving the state’s educational system.

- 7) The state must develop its own capacity to design, develop and manage the investments it makes in state and local improvement infrastructures.
- 8) The investments made in state and district infrastructures should be evaluated by independent third parties using criteria that are appropriate for evaluating investments in infrastructure<sup>x</sup>.

## **Summary**

The GDTF summary report states: "No one program or intervention will fix the system. California has tried over and over the approach of introducing separate program and disjointed new policies." The report also states: "For schools in high-poverty communities to reach California's high student achievement goals it will likely require new approaches and a system that supports continuous improvement." For these reasons we believe that the challenge of raising student achievement can never be adequately addressed without creating the capacity to continuously improve the quality of classroom instruction. And in the current budget climate, long-term investments in capacity can never compete with operational needs that are more salient and more apparently urgent. Since the passage of Proposition 13 there has been a slow steady erosion of both state and district improvement capacities. The pressures of No Child Left Behind have exacerbated the tendencies to fund the immediate in lieu of investing in the future. What is needed now is the foresight and courage to invest in educational improvement capital and create strong ongoing improvement infrastructures that can do the steady long-term work needed to improve instruction. Our work with many different initiatives over the years suggests that a steady annual investment on the order of 5% of the total educational budget could create a strong set of nested improvement infrastructures that would bring returns for years to come.

## References and Notes

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<sup>i</sup> For more on the need to invest in infrastructure see Guiding Principles for Strengthening America's Infrastructure, [http://www.csis.org/media/csis/pubs/060327\\_infrastructure\\_principles.pdf](http://www.csis.org/media/csis/pubs/060327_infrastructure_principles.pdf)

<sup>ii</sup> Educational improvement capital is a slightly different, but very related notion to the concept of "educational capital" discussed in the book, Reconnecting Education and Foundations, Turning Good Intentions into Educational Capital, Bachetti, R. and Ehrlich, T., 2006, Josey-Bass.

<sup>iii</sup> For more about Doug Engelbart, see <http://www.bootstrap.org/>.

<sup>iv</sup> Doug Engelbart is interested in ways to augment human knowledge and improve operations of individuals and institutions. He is perhaps most famous for inventing the mouse which is used on almost all computers today.

<sup>v</sup> For more on the NWP see [www.nwp.org](http://www.nwp.org).

<sup>vi</sup> For more on the way the NWP serves as an improvement infrastructure see multiple reports on our website ([http://www.inverness-research.org/nwp\\_portal.html](http://www.inverness-research.org/nwp_portal.html)).

<sup>vii</sup> For a good study of the role of different organizations involved in improving education, see The Ecology of School Improvement: Notes on the School Improvement Industry in the United States in The Journal for Educational Change, Volume 3, 2002 (<http://www.springerlink.com/content/pqt02j272kl6/?p=c88b572b2cfa40118e0280d03fbf276f&pi=0>)

<sup>viii</sup> A good example of the development of district-based improvement infrastructures can be found in the work of the NSF Local Systemic Change initiative and the NSF Urban Systemic Initiative. In cities across the country NSF support over five years led districts to develop strong internal discipline based "improvement departments" that were capable of supporting instructional improvement in a continuing fashion. For examples see a study of San Diego, CA ([http://www.inverness-research.org/reports/ab2007-04\\_Rpt\\_SanDiegoLL.htm](http://www.inverness-research.org/reports/ab2007-04_Rpt_SanDiegoLL.htm)) and Gilbert, AZ ([http://www.inverness-research.org/reports/ab2006-11\\_gilbert\\_infrastructure.htm](http://www.inverness-research.org/reports/ab2006-11_gilbert_infrastructure.htm)).

<sup>ix</sup> Today approximately one-half of the NWP annual budget goes toward supporting the national network of sites and the development of leadership; the other half funds the activities and services offered by the project sites.

<sup>x</sup> For approaches to evaluating investments in infrastructure see *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* ([http://www.inverness-research.org/reports/ab1998-11\\_Rpt\\_DOE\\_RegionalEducLab.htm](http://www.inverness-research.org/reports/ab1998-11_Rpt_DOE_RegionalEducLab.htm)).