



C C T R E S E A R C H S U M M A R Y
A P R I L 2 0 0 4

**THE REINVENTING EDUCATION INITIATIVE
FROM AN EVALUATION PERSPECTIVE:
*THE ROLE OF INNOVATIVE TECHNOLOGY PARTNERSHIPS IN
ADDRESSING SIGNIFICANT CHALLENGES TO EDUCATION
IMPROVEMENT***

PREPARED FROM
IBM REINVENTING EDUCATION
GRANT PARTNERSHIP INITIATIVE
IMPACT EVALUATION REPORTS

CENTER FOR CHILDREN & TECHNOLOGY

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INTRODUCTION

In the last decade alone, technology has completely reshaped how we live and work as well as how we educate our children in unanticipated, remarkable ways; however, schools have struggled to adjust and keep pace. “During the past 20 years, the skills required to succeed in the economy have changed radically, but the skills taught in most schools have changed very little. As a result of the growing mismatch between the skills of most graduates and the skills required by high-wage employers, a U.S. high school diploma is no longer a ticket to the U.S. middle class.” (Murnane & Levy, 1996, p.3).

How do public schools and informal education programs meet this growing demand to produce highly skilled individuals, an expectation that ALL children will achieve at a level much higher than required in previous eras? This question now reverberates nationally in conversations among and between educators, employers and the general public because it poses a challenge not only to the future of our civic life but also to the future of our economic and global competitiveness. It’s a challenge that demands much more than cosmetic change or stopgap measures. Inadequately trained teachers, unfocused curricula, inadequate exposure to technology, and the inefficient use of resources inevitably result in poor student performance and the inability to compete globally. Worldwide comparisons like the Third International Mathematics and Science Study demonstrate the true extent of failing schools in the U.S. But while fixing public education tops our national agenda - a challenge that many public and private institutions have attempted to address - success stories in school reform are few and far between.

Recent efforts in school reform have fixated on building a new foundation based on standards and accountability. However, this alone may not be enough. Long-term commitments and a sophisticated understanding of how to improve student achievement are what many experts suggest education reform needs. As *Learning from Each Other*, a report published by Grantmakers for Education, remarks: “School reform is a messy, complicated, often frustrating challenge that requires patience and staying power. Equally important ... significant reforms are likely to endure only if the current system is changed in fundamental ways.” (Kronley, 2000, p.iii)

Leading policy reports note that it will take not only substantial government investment in public education, but also input, leadership, and financial support from public/private partnerships, local communities, and professional organizations representing both educators and employers (McKinsey & Co., 1995; U.S. Congress, Office of Technology Assessment, 1988; President’s Committee of Advisors on Science and Technology, Panel on Educational Technology, 1997; U.S. Department of Education, 1996, 2000).

IBM Corporation has stepped into this void, partnering with states and districts in the United States through its Reinventing Education initiative to meet the demands for sustained and fundamental reform called for by Grantmakers in Education and others.

The IBM Approach

In 1994, IBM rewrote the role of corporate philanthropy in education with the announcement of Reinventing Education, the grant program through which the company would distribute the bulk of its charitable dollars. An outgrowth of IBM's belief that business has a tremendous responsibility to improve education and that IBM technical expertise, working in collaboration with school leadership, could make meaningful contributions to schools, Reinventing Education was designed to raise the quality of teaching and learning for all children by tending to systemic problems both at their roots and over time. Today, nearly ten years later, the Reinventing Education initiative is a sweeping \$70 million education reform program that involves dozens of school districts and states throughout the US, and many international sites. It includes thousands of teachers and millions of students with documented success in both urban and rural areas.

What is Reinventing Education?

In contrast to typical public-private partnership reform efforts in technology, which adopt and adhere to specific programs or curricula for set, usually short, periods of time, the Reinventing Education program charted a different course for change that focused on cultivating long-term, flexible educational research and development partnerships with urban school districts and state education departments. These Reinventing Education partnerships responded directly to immediate needs of each partner state or district, not only targeting *district-identified* challenges impeding educational reforms and improvements but also addressing them through *co-developed* interventions. In addition, IBM linked the challenges identified by individual Reinventing Education sites to those which many other states and districts are struggling to overcome, allowing Reinventing Education to serve local needs while tackling larger reform issues of national importance.

Through its unprecedented combination of scale, comprehensiveness and thoughtful technology use, IBM's Reinventing Education has yielded the following accomplishments:

- Implemented programs that will serve as best practice models for other school reform initiatives
- Developed new technology tools that improve teaching and learning;
- Documented significant and positive improvements in student achievement
- Established effective, ongoing programs for teacher professional development
- Sustained reform momentum after the life of the IBM grants
- Scaled reform within and among multiple sites
- Encouraged states and districts to contribute equal or greater amounts in developing and sustaining the Reinventing Education solutions

In 1997, the EDC Center for Children and Technology (CCT) began a long-term evaluation study of the sites where the program was launched. Five years later, CCT has found that IBM's Reinventing

Education program produced successful solutions that are addressing long-standing barriers to public school reform — barriers such as how teachers can be developed over the life-span of their careers, how information is shared and used, and how learning is measured. But, even more so, this evaluation revealed that the intense partnership process, which distinguishes Reinventing Education from other school reform efforts, leads to real change in the way schools went about the business of teaching children. The initiative's successes at scaling site-based solutions also supports the notion that what works well in one school district or state can work equally well in another. Taken together, these findings make a strong case that Reinventing Education is a compelling model for systemic school reform. This summary report draws from research findings described in more detail within our March 2003 Impact Evaluation Report.

Reinventing Education as a Reform Model

To understand more fully what distinguishes Reinventing Education from other school reform efforts, it's important to first review more traditional routes taken by other major funders interested in school reform and/or technology investments in education. When computers were first introduced to K-12 education, corporate philanthropy from the technology industry largely consisted of equipment donations or funding specific technology programs, what could be termed a 'pump and dump' approach. Other research and development efforts in education were limited to underwriting the development of discrete, stand-alone education products that were foisted on schools without follow-up or corporate involvement. At best, the school setting was a proving ground where technology-based materials and programs developed elsewhere were squeezed into curricula like irregular jigsaw puzzle pieces - a process unheard of in private industry. While such programs appeared useful for the children directly impacted, these programs did not begin to address the larger educational problems facing public education, a shortcoming cited in research conducted by Harvard Business School. (Kanter, R., 1998)

Commitment to Partnership

Reinventing Education called for a fundamental and radical shift in the way a private corporation (IBM) and representatives of public institutions (schools districts and state departments of education) worked together. IBM approached its school partners as valued business partners; put its research capabilities to work for the program; and came in prepared to stay for the long haul.¹ IBM did not expect advanced information technology alone to transform an organization as complex as a school district. History had already demonstrated that simply donating computers to schools would not raise the level of student performance. Instead, Reinventing Education focused on identifying and addressing core education processes that could be critical levers in school change, such as student assessment practices, continuous teacher improvement models, and teacher instructional planning.

¹Reinventing Education planned three-to-five-year partnerships with its grant sites, far exceeding the customary eighteen months in more traditional corporate philanthropy.

Providing Integrated Expertise

Much of Reinventing Education's success can be credited to the corporation's unyielding commitment to the initiative. IBM went far beyond just writing checks and donating inventory. The company demonstrated the priority it placed on raising the quality of public education by providing expert talent to the initiative. It recruited and paid the salaries of full-time IBM employees from its research laboratories and consulting organizations to work elbow-to-elbow with educators in the classrooms. The initiative was not an extracurricular activity, but an actual work assignment. This decision ensured that IBM's award-winning researchers and consultants could make sustained, valuable contributions to the initiative goals and that they had a stake in their site's success.²

IBM used a Request For Proposal process to identify partners that were ripe for sustained, systemic change. The corporation deliberately selected school districts and states that

- Identified specific problems amenable to innovative technology solutions
- Made Reinventing Education an integral component of their reform efforts
- Envisioned scaling the successes of the program.

IBM required foremost that its potential partners display a vision for innovation and commitment. IBM's selection criteria called for "school districts that can demonstrate their commitment to reform...with proven leadership and a document history of innovation in improving schools." The company put a premium on grantees having high academic standards, reform experience, public commitments from leaders at the state level to the district superintendent to the school, broad parent involvement, and potential collaboration with other national reform initiatives. These partner requirements for vision, leadership, track record and stakeholder involvement were designed to meet the many demands and challenges encountered in efforts to produce and sustain systemic education reforms. In addition, IBM purposely sought out school systems in tough educational environments. Most of the districts participating in Reinventing Education are large, urban districts with all the additional problems and complexities endemic to inner-city public education. Similarly, IBM selected rural state partners with their own set of difficult hurdles to overcome. Collectively, the projects addressed a wide spectrum of education challenges that are common nationwide, from home-school communications to data management and analysis to classroom instruction to teacher training to student assessment.

Extended Timeframe and Iterative Development Process

Large-scale education reforms, especially those involving technology, are not modules attached as standalones to existing school practices. They are integration challenges that require revisiting, reevaluating and rewiring school practices at administrative, departmental and classroom levels in

² It should be noted that these people were recruited from a wide variety of IBM business sectors – not just its education group.

order to establish the skill levels, lines of communication, and organizational structures necessary for the reforms to flourish. These changes in practice and structure can precede the implementation of a reform initiative or can be driven by the reforms themselves. As Professor Rosabeth Moss Kanter of Harvard Business School points out in her case study of Reinventing Education, IBM made a strategic decision to allow the process of designing, creating, and implementing new technologies and the organizational obstacles encountered in these efforts to drive schools to alter their practices in meaningful ways that enabled the new technologies to be implemented. (Kanter, R., 1998).

Businesses operate on very different timetables and process expectations than schools. IBM recognized this from its original Request for Proposals, which were open-ended, to its year-in, year-out commitment of IBM personnel dedicated to individual sites and site goals. The company charged both its employees and site managers to focus on crafting a common definition of what the site intended to achieve with its grant and then work together toward realizing the goal, typically in the form of a new technological tool. After the planning period, the projects moved through an extended period of iterative development, feedback, refinement and testing, and eventually matured into a significant scale-up effort at the sites where the solutions became institutionalized. Flexibility has been a hallmark of the program; not one of the solutions that have emerged is the same as originally conceived.

Implementation and Scaling

IBM's Reinventing Education initiatives went through three critical stages. The first dealt with the discovery process, defining the problem and devising a solution. The second stage involved implementing the blueprint, getting it to take root in the institution, and then scaling it up to other schools. This phase took three to five years. The third stage combined the most proven solutions onto a unified platform and shared best practices across sites to spread the impact of the program. This scaling up process represented a new paradigm for public-private partnerships and for technology use within schools. The outcomes are partnerships based on mutual respect, the importance of listening to one another, and the value of giving everyone a say in the development of the solution. For many of the school districts and states, even those accustomed to receiving support from large corporate or private foundations, defining and driving the reform process was a whole new experience.

Long after the formal grant periods ended –past the point when the grant funds were exhausted –IBM remains involved with the sites and continues the partner relationships, a commitment to change rarely seen in school-based technology collaborations. This commitment was not an afterthought, but, rather, an outgrowth of IBM's initial goals of sustaining reform momentum past the life of the IBM grants to a point of institutionalization in the district or state.

In this regard, IBM Reinventing Education meets two key themes that emerged from our recent analysis of twenty years of policy recommendations regarding education technology investments, a

research review conducted on behalf of the U.S. Department of Education for its National Education Technology Plan. The first theme is the ebb and flow of practitioners' needs and challenges as a guiding force in shaping where and how technology becomes a part of the educational system. By partnering directly with sites on issues and solutions they identified, IBM made great strides in satisfying this demand. The second theme relates to the need for a better understanding among both researchers and policymakers of the *systemic* nature of educational change in general and of educational technology integration in particular (McMillan Culp, K., Honey, M., & Mandinach, E., 2003). IBM's extended commitment to its partners above and beyond the grant period and parameters speaks directly to this recommendation.

Leveraging Success Across Sites

IBM's strategy was to incrementally build upon early success evidenced in the initial phase of the program. IBM leveraged these earlier accomplishments across all Reinventing Education sites by bundling the technology solutions created within individual sites into one, unified platform called Learning Village (see Tables 2 and 3 in the Appendix). This platform, which enables teachers and administrators to use the full range of Reinventing Education applications, has subsequently anchored IBM's scaling of the initiative, allowing grant sites to leverage both their investments and the investments of other sites in addressing their original target issue and broader educational needs. The Learning Village suite addresses three areas of critical need: technology integration, student learning, and teacher professional development.

Indicators of Effectiveness

Supporting Teacher Training and Development.

Multiple research studies on both the policy level and the implementation level have consistently identified teacher development and change as a critical factor in improving schools (National Commission on Teaching and America's Future, 2003; Sivin-Kachala & Bialo, 2000; West Ed, 2002; U.S. Congress, Office of Technology Assessment, 1995; Coley, Cradler & Engel, 1997; Silverstein, Frechtling & Miyoaka, 2000; Sandholtz, 2001). The Reinventing Education sites, by design and through experience, have produced significant changes in the way that partner schools are conducting professional development. This is a significant impact not usually seen with typical technology adoption programs.

At the grant sites, technology focused and, in some cases, forced sites to examine practices related to professional development, acceptable quality levels, and acceptable time frames. All of the sites have evolved sophisticated ways of providing professional development for the teaching staffs in their schools. For some of the sites, this was the main focus of their solution. Others made professional development a part of the implementation process. All evolved professional development solutions that are characteristic of what recent research tells us are key qualities for effective teacher development - sustained opportunities that are imbedded in the regular teaching experience and immediately available to the teachers. For instance, teacher training in the use of many

of the solutions moved from special “workshops” typical of most forms of teacher professional development to job-embedded teacher improvement practices where school teams or teacher partnerships took on the role of supporting the use of the solution. This practice has been identified by research as more productive. In turn, this examination resulted in changes in practice that directly addressed core areas affecting student achievement.

Improving Student Achievement

Increasingly, states and school districts are being asked to justify their investments in educational technology by demonstrating that technology improves students’ performance on state-mandated tests. The U.S. Department of Education’s No Child Left Behind Legislation requires that if districts use federal funds to purchase instructional materials or programs, these resources must be “scientifically based,” meaning that they have been evaluated using experimental or quasi-experimental research methodologies. Research conducted on the Reinventing Education program in West Virginia demonstrates that technology investment coupled with professional development and careful program planning can result in significant gains in student achievement. An analysis of student test scores at two case study schools in West Virginia over three years indicates a relationship between high use (more than 10 instructional hours) of a Learning Village lesson and an increase in student outcomes measured by Stanford Achievement Test – Nine (Stanford 9) test scores. Where there was a greater professional development push and higher use of lessons, students outperformed the control group (random selection of students from the county where the school is located) in every test category.

The analysis shows statistically significant differences between those who used these instructional units and those that did not (see Table 3 in the Appendix). This finding, combined with studies from CCT’s earlier research with middle and secondary classrooms, indicates that the student outcome improvements hold up across grade levels and across the main academic areas (reading, language arts, listening comprehension, mathematics, social studies, and science).

Sustaining Programs Beyond the Grant

If there is a litmus test for success in education reform efforts, then it is the ability of programs to maintain momentum and scale when the grant funding ends, something few initiatives manage to achieve. The Reinventing Education sites stand out as exceptions, having achieved a level of institutionalization rarely reached, based in part on a mechanism where past accomplishments perpetuate future ones, furthering the impact on teaching and learning in their schools. Sites are now adding staff members with specific job functions that support and extend the solutions. In addition, they are covering technical maintenance and support costs while also applying the solutions creatively to new areas beyond those originally targeted by the solutions. Examples illustrating Reinventing Education’s continuing impact include:

- In San Francisco, the district continues to use and improve the Student Success Team case management tool. Because of increased interest from the superintendent’s office, it is now integrated into the district’s overall reform efforts.

- Broward County, FL, continues to expand the data warehouse specifically through the new web interface that has dramatically improved access and usability. This is evidenced by the unique requests for over 200,000 data reports from teachers and administrators. This access has now been broadened to include both students and their parents.
- In Memphis, TN, Learning Village tools and resources are a core component of the professional development program with over 85 schools in the district receiving whole school training.
- In Vermont, Standards into Action, the state-level Reinventing Education initiative to promote and foster standards-based teaching through professional development within its school systems, has proven so effective that the state will integrate the program into the preservice training of all incoming teachers.

The most compelling evidence for sustainability lies in the number of sites remaining active in the program.

In response to the first grant proposals submitted by school districts and state departments of education as part of Reinventing Education I, IBM gave approximately \$2 million awards each to 10 individual sites to create customized solutions. Nine of these sites went into full implementation and remain active today (see Table 1 in the Appendix). In October 1997, IBM awarded 12 additional grants as part of Reinventing Education II to take existing Reinventing Education I solutions, refine and adopt them. These grants were smaller financially and shorter in duration: each award ranged from \$475,000 to \$875,000 and the grant period lasted approximately eight months. Despite the tighter timeline and smaller funds, 11 of the 12 remain active sites and continue to utilize their solutions (see Table 2 in the Appendix). Reinventing Education III³, announced in 2002, established 11 partnerships – eight with existing entities from Reinventing Education I and Reinventing Education II.

Meanwhile, IBM remains involved. Through the Reinventing Education grants, IBM has made a sizable investment in reform efforts – more than \$45 million on Reinventing Education I and Reinventing Education II and now an additional \$25 million for the recently launched Reinventing Education III. IBM continues to support reform after sites' grant periods end through local corporate community outreach, providing everything from access to mature solutions from other Reinventing Education sites to ongoing tracking of the site's implementation process and combining its tool with other Reinventing Education solutions. IBM's substantial Reinventing Education investments have also encouraged states and districts to make significant investments of their own toward developing and sustaining the Reinventing Education solutions. In Broward County, where IBM's initial investment (made through Reinventing Education I) led to the creation of the data warehouse, the district has made maintaining and expanding the data warehouse a part of its

³ In Reinventing Education III, nine of the grants focus on working with faculty and students at leading schools of education in nine states, along with various public education entities and local districts to develop quality training and professional development programs that help states meet the requirements of the No Child Left Behind Act. Two of the grants extend previous Reinventing Education work in data warehousing and data driven decision making for educators.

annual budget. Broward is now developing a new web-based graphic user interface for the data warehouse and instituting district-wide training of educators and parents.

Common Success Factors

Although many of the most compelling aspects of the Reinventing Education initiative stem from the uniqueness of the projects undertaken by the individual school districts or state departments of education, a number of success factors are common across sites. These factors provide a basic blueprint not only for successful Reinventing Education endeavors but for public-private education partnerships in general.

Visibility

No matter how strong a solution is to an educational problem, it needs support to take root and pay dividends. IBM selected partners who identified a significant barrier to quality education and who demonstrated a clear commitment to working hard on the solution. IBM required that a site demonstrate commitment through carefully structured advisory boards and public attention and involvement. Philadelphia and San Francisco, for example, included private partners such as the Every Child Can Learn Foundation and the Philadelphia Education Fund on the Reinventing Education project management team to work closely with the project coordinators to sustain the program's momentum and ensure that the program would remain central to the districts' reform efforts.

Realistic Expectations

In addition to visible change, reform efforts need to set realistic expectations about the time, energy, and resources required to bring system-wide changes to fruition in the classroom and across the site. At the site level, broad indicators such as improvements in student test scores happen only after an implementation has matured. In Reinventing Education, each district or state had to be prepared to make policy decisions about the organization's commitment to Reinventing Education so that solutions could be fully implemented to see a positive impact. In West Virginia, teachers used Instructional Planner to align the design of their instructional activities directly to state standards and areas in the Stanford 9 tests where students were consistently showing weakness. At the classroom level, getting teachers not only to increase their technology skills but also change their practice is a slow process that requires dedication. Teachers need time and support to adjust to new methods and ways of thinking about technology in the classroom. In Memphis, the district professional developers not only conducted basic technology training workshops but also provided resources to support teachers in the adoption of more project-based pedagogical strategies.

Open Communication Among Stakeholders

Large-scale reform efforts cut across classrooms, across departments within schools (such as IT, Student Research and Assessment, and the Office of Professional Development), and across regions,

requiring a high degree of coordination, planning, thinking, and support, and touching different sets of stakeholders who are not usually required to communicate with one another. Ensuring these changes take place requires open lines of communication among the various stakeholders, making it possible for them to work collaboratively or complementarily toward achieving specific program goals. Learning Village applications are designed to support change in administrative and workplace practices. In San Francisco, the Student Success Tool, which identifies students in need of extra resources in the general education classroom while systematizing the special education referral process, required organizational change from the classroom to the district. For example, teachers and resource specialists began thinking about differentiated instruction in new ways. Departments such as Professional Development and Special Education that had never before collaborated began working closely to better deliver classroom strategies and resources for teachers. Collaborations such as these need participants from different levels of the system to share not only similar reform goals but also a common understanding of the process it takes to get there.

Distributed Leadership

Identifying committed leadership is vital to a project's success; however, it is just as important to create a team or network of capable leaders and facilitators that will enable wide-scale implementation. Leadership also needs to be cultivated on a consistent basis to ensure an initiative's continued growth and success, allowing project participants to not only reduce the strain on individual coordinators, but also keep pace when staff turns over or when the amount of work required to sustain the project increases. Only one of the original Reinventing Education sites has the same Superintendent who originally signed onto the project. IBM recognized that staff turnover would present a significant challenge at each site, and planned for the inevitable change in leadership by using advisory boards, outside agencies or intermediaries, and team approaches with cross-training of key personnel all to help limit the impact of turnover. For example, in Philadelphia, the district faced significant challenges including the privatization of 30 schools, a change in superintendent and a reorganization of district schools. Through all of these changes, the Reinventing Education project, with help from key partners, maintained its course and continued to expand the numbers of teachers and schools that participated in its programs.

Leverage

Large scale investments in change need to have practical strategies to identify and promote lessons learned and promising practices at all levels of implementation within sites and within classrooms both to help accelerate future program expansion and to keep the community of practitioners engaged in active thinking about how to improve the use and impact of the tools or resources.

Sites selected for the second phase of Reinventing Education benefited from the work of their predecessors, significantly shortening the time needed to move from initial exploration to large-scale implementation. Driving the streamlined process was experience. IBM developed a better understanding of what to expect and how to prepare new sites for the development process by reflecting on and learning from its earlier efforts in the first round of Reinventing Education grants. In the initiative's second phase, South

Carolina easily adopted the Data Warehouse developed by Broward County in the first phase by using the experience and methods of Broward's own implementation as its guide. By defining its users and their needs in advance, South Carolina was able to streamline user access and training.

Professional Development

The innovative practices modeled by large-scale reforms demand complex sets of skills from teachers, administrators and technology support staff that few project participants already have. Preparing these participants to fully implement new practices and grooming them to assume leadership roles as staffing needs arise requires a substantial amount of professional development.

Many teachers still need to learn the fundamentals of using computers. Once teachers become accustomed to using computers and other technologies and develop a repertoire of technical literacy skills, the next step is to support teachers in using these tools to enhance their classroom practice in meaningful ways. This requires professional development about using technology not just to support what they are already doing but as a catalyst for changing how they teach as well. As a result, technology literacy has to occur simultaneously to the solutions' introductions. In West Virginia, where the goals of the project were to address student weaknesses by redesigning curriculum to more effectively teach to the standards, teachers learned new technologies that allowed them to create curriculum while simultaneously rethinking their curriculum and pedagogy.

Professional development should also extend to creating a pool of trained IT staff members because these professionals are difficult to recruit and retain. Those skilled in information and communications technologies can command much higher salaries in the private sector than in school districts and departments of education. Project leadership has to keep this in mind as they engage in long-term planning, making sure they build into their plans efforts to grow people internally. Nearly all Reinventing Education sites had to replace essential data management and IT personnel when key staff left the projects. In the case of the data warehousing projects, the job mentoring and shadowing offered by IBM to the personnel assigned to work on the projects allowed sites to maintain continuity in job functions. Working side-by-side with IBM provided individuals on site with important training and helped augment their skills, which is crucial in retaining staff as well as preparing staff to assume roles of greater responsibility.

Accountability

Setting goals and collecting evidence play crucial roles in both ensuring steady, meaningful professional growth for teachers as well as reform sites. For teachers, yearly and multi-year goals articulate what areas they want to focus on in the coming year, help them reflect more critically on the roles of the technological tools in their practice, and provide useful assessments that help professional developers target teachers' identified strengths and weaknesses, a common practice in many larger private and public organizations. In San Jose, for example, teachers used Learning Village tools to develop action plans that helped them not only identify professional goals for themselves and goals for their students, but also devise strategies for meeting both sets of goals. Such goals

include creating relevant indicators of progress on key objectives, tracking progress on those indicators, analyzing and communicating that data with those who are responsible for improving the implementation, and using this data to make changes in curriculum or to create professional development programs to support changes in teaching practice is no simple challenge to meet, but plays a pivotal role in the successful scaling-up of reform initiatives.

While not a replacement for outside evaluation and research, such internal accountability practices provide valuable evidence and data not only to continually refine program implementation but also to help districts communicate effective use of technology, a crucial endeavor in a climate of reduced technology funding and increased demand for results on prior investment. The fact that most of the Reinventing Education sites leveraged their work into new grants and funding programs is itself a strong indicator of the institutionalization of the solutions within the participating districts and states. West Virginia has leveraged the Reinventing Education work to support several initiatives included Preparing Tomorrow Teachers to Use Technology and GearUP. Most recently, West Virginia received not one but two U.S. Department of Education grants to evaluate educational technology.

CONCLUSION

In the near ten years since IBM launched Reinventing Education, much has changed within the technological landscape of our lives and schools. The information and communications technologies that exist today were in their infancy when the initiative began. Reinventing Education worked in partnership with school districts to adapt these new technologies to key education challenges. IBM focused on real barriers and significant leverage points concerning teaching practice and student achievement. The company teamed its renowned technologists with local innovators in developing technology applications that addressed these needs. The company bundled the work of individual sites into a suite of flexible tools and made the tools available across sites.

The initiative's success in fostering system-wide change is captured in the degree to which teachers use Learning Village tools, the extent to which teachers are integrating technology into practice, the degree to which Learning Village-infused instruction is improving student achievement and the extent to which Reinventing Education sites continue to sustain their programs after the grant periods end. We estimate that 65,000 educators were accessing Learning Village by fall of 2002, a number that continues to grow at most of the sites. Teacher professional development in using technology and integrating it into the curriculum also increased significantly in all of the initiative's districts and states. When Learning Village applications were targeted to specific instructional objectives, results were substantial as evidenced by the West Virginia students who outperformed their peers in every test category on the Stanford 9 tests in successive years. And, the majority of Reinventing Education sites continue to use and contribute to the refinement of Learning Village applications beyond the original grant period.

Taken together, these results indicate that the Reinventing Education solutions successfully moved from innovative experiments to core, systemic components of institutional operations and are having sustained value. The initiative is achieving its goals and perpetuating its programs. This matches precisely the three indicators for sustainability gathered through current and previous research work: development of a culture of innovation, institutionalization of edtech, and gathering and communicating evidence of effective use of technology (The Benton Foundation, 2002). IBM's Reinventing Education satisfies all three indicators, providing important lessons for both funders and schools and a model worthy not only of further examination but also of replication.

Table 1: Reinventing Education I Sites, Goals, Components

SITE	GOAL	TOOL
Broward County Public Schools	Promote accountability	Data Warehouse
Charlotte-Mecklenburg Public Schools	Improve parent involvement and teacher professional development	Wired for Learning
Chicago Public Schools	Improve teacher professional development	Wired for Learning
Cincinnati Public Schools (Inactive at time of this report)	Promote accountability Strengthen assessment	Credit Granting Standards Tracking Tool
School District of Philadelphia	Improve communication and teacher professional development	Continuous Practice Improvement Model
San Francisco Unified School District	Improving the Special Education referral process Increase teacher professional development and parent involvement	Student Support Team Tool
San Jose Unified School District	Improve teacher professional development and classroom practice	Electronic Portfolio Tool/ Wired for Learning
Vermont Department of Education	Strengthen curriculum and assessment	Authentic Assessment Tool/ Wired for Learning
West Virginia Department of Education	Improve teacher professional development and classroom practice	Instructional Planner/Wired or Learning

Table 2: Reinventing Education II Sites, Goals, Components

SITE	GOAL	TOOL
Atlanta Public Schools <i>(Inactive at time of this report)</i>	Strengthen curriculum	Visual Venture
Boston Public Schools	Strengthen curriculum and assessment practices	Authentic Assessment Tool
Detroit Public Schools	Increase parent involvement and teacher professional development	Wired for Learning
Durham Public Schools	Increase parent involvement and teacher professional development	Wired for Learning
Maryland State Department of Education	Strengthen curriculum and assessment practices	Public Access Viewer
Houston Independent School District	Strengthen curriculum	Watch-me!-Read
Memphis City Schools	Strengthen curriculum and assessment practices	Authentic Assessment Tool/ Wired for Learning
New York City Public Schools	Strengthen curriculum and assessment practices	Authentic Assessment Tool
New York State Education Department	Improve teacher professional development and classroom practice	Wired for Learning
Rochester Public Schools	Strengthen curriculum	Visual Venture
South Carolina Department of Education	Promote accountability	Data Warehouse
Texas Education Agency	Promote accountability	Statewide Data Feed

Table 3 – Summary of data for 2000, 2001 and 2002 School-County Sample

Means and Standard Deviations of West Virginia Standardized Test Scores for one school cohort. The school group consists of all students in all classes where teachers used Instructional Planner juried lessons extensively starting in Year 2001 and continuing in Year 2002. The students in the County sample are selected randomly from the total population of students taking the SAT 9 that year. School and County represent same SES factors. Note that the two populations have no significant differences in all but one area (science) until Year 2002 – after the use of IP lessons.

		YEAR 2000		YEAR 2001		YEAR 2002		
		GRADE 3		GRADE 4		GRADE 5		
		Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation	n
Reading Total								
School		625.04	(44.45)	650.09	(41.57)	671.18	(38.31)	68
County		623.68	(38.15)	650.75	(32.88)	659.02	(36.40)	44
Language Total								
School		629.74	(43.80)	660.19	(46.75)	661.16	(39.52)	68
County		611.45	(33.45)	643.66	(37.15)	638.91	(34.68)	44
Spelling Total								
School		628.63	(55.78)	643.85	(41.13)	656.90	(49.35)	68
County		610.52	(39.63)	642.84	(38.45)	646.34	(31.57)	44
Listening Total								
School		629.67	(29.31)	662.37	(41.35)	672.55	(38.52)	67
County		632.55	(25.04)	659.20	(36.47)	656.84	(29.88)	44
Social Studies Total								
School		617.96	(39.49)	631.66	(34/62)	641.97	(35.23)	67
County		597.82	(31.86)	629.99	(33.84)	619.75	(30.58)	44
Science Total								
School*		632.88	(39.38)	663.66	(36.75)	662.52	(34.38)	67
County		620.61	(33.61)	649.32	(27.34)	649.59	(29.46)	44

Note: Significant mean differences between school and county samples appear in bold. * Students in the School sample for science scored significantly higher ($p < .05$) than students in the County sample across all three years.

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