

**GETTING PAST GETTING STARTED:
METROLINC YEAR 2 EVALUATION**

(July 1998 - June 1999)

A U.S. Department of Education Technology Innovation Challenge Grant

submitted to the Project by:

ROCKMAN *ET AL*
San Francisco, CA

August, 1999

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Cynthia Char
Saul Rockman

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Executive Summary

MetroLINC is a partnership between the Boston and Watertown, MA public schools. As stated in its Year 2 report to the U.S. Department of Education,

MetroLINC's primary goal is to improve student performance through the integration of technology to support statewide and district-wide curriculum standards. MetroLINC's primary focus, towards that goal, is to find innovative ways to help teachers gain the technology skills and understanding they need to integrate technology effectively in the classroom, and to help students gain the skills, ethics, and discernment they need to participate responsibly in a technological society.

MetroLINC represents a unique effort among the growing number of school technology projects: it builds on the city of Boston's commitment to equip all of its public schools and guides the use of that technology in support of the state's newly created curriculum standards. It is also designed to support the curriculum reform efforts already underway in Watertown. The Boston-Watertown partnership seeks to address the common phenomenon of urban and suburban schools—even in geographical proximity—remaining remarkably separate without a dedicated and concerted effort to strengthen connections between districts.

A key component of the project is a Pioneer/Adapter model for involving teachers in curriculum design and implementation. In this model, a mentor teacher ("Pioneer") works closely with a small group of teachers ("Adapters") who are interested in adapting the Pioneer's technology unit for their classrooms. Each MetroLINC teacher was part of one of these teacher-led design teams. In Year 2, there were 166 teachers participating in the MetroLINC project, forming a total of 43 design teams.

This past year, the ROCKMAN et al evaluation team investigated a wide spectrum of the multi-tiered MetroLINC project. A variety of data collection methods were adopted:

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- pre-program and post-program written questionnaires (144 teachers, representing 52 schools)
 - classroom observations and follow-up interviews (16 teachers, representing 7 schools)
 - telephone interviews (32 teachers, representing 21 schools)
 - observation of teacher institutes and workshops

Major findings from the study include:

- Boston's strategic approach of coupling MetroLINC teacher participation with distribution of new computer hardware was very successful. Survey data reflect the infusion of computer hardware in Boston MetroLINC classrooms. The average number of computers in classrooms went from slightly less than two in the school year prior to joining MetroLINC to almost five after becoming a MetroLINC teacher. Adapters reported significantly higher levels of using on-line telecommunications and CD-ROMS as resources for their classrooms.
- A number of Boston teachers reported how the project has dramatically transformed their classrooms, with the increase in the number of classroom computers enabling teachers to create whole-group and small group computer activities for students. Adapters reported a significant decrease in their use of teacher-centered activities. Teachers also described how the increased computer hardware allowed them to more fully incorporate the use of computers in student projects and assignments, and in key subject areas.
- In keeping with the Boston and Massachusetts curriculum frameworks which emphasize student-created original products and presentations, MetroLINC teachers tended to focus on technology tools, such as word processing and multimedia presentations, and to a lesser extent, data bases, spreadsheets and graphing tools. Many teachers reported projects in which students directly used the Internet as an information resource for student research.
- Teachers report that the greatest areas of professional growth were associated with the technology aspects of the project, namely, the greater integration of technology in curriculum, and more effective use of technology with students. Teachers also reported a significant increase in their knowledge of telecommunications over the course of the year. Adapters also reported a significant increase in their level of comfort in using technology in their classrooms as a consequence of participation.
- A number of teachers report learning a variety of new technology skills and applying them in their classrooms. Much of this learning occurred in the structure of MetroLINC's teacher-led design teams and the opportunities to develop as teacher-leaders and contributing colleagues. Many commented about increased self-confidence and the satisfaction resulting from taking on responsibility and the concrete outcomes of a personally-created curriculum unit that integrated technology.
- When forming design teams, teachers were more likely to choose and work closely with teachers they already knew, either within their own school building or in another school. At the same time, teachers did report increased frequency of communication

with their colleagues, and noted the benefits of working on a shared project. While pioneers often knew some of their adapters, they rarely had the chance to work as deeply with someone else as they had this past year. Several teachers reported how the design teams within a building gave rise to new, continuing support groups, and allowed new teachers to be recognized as teacher leaders in their schools. The fact the MetroLINC is district-wide in Boston and Watertown also seems to help with coherence and continuity.

- Despite the thoughtful efforts of both districts' MetroLINC staffs, there was fairly limited cross-district teacher collaboration. Given such factors as time and work demands, teachers strongly prefer to work in their own school building, wish to minimize travel, and prefer working with others they have already worked with in the past. Where cross-site collaborations took place, the design teams were led by strong, highly motivated, focused, and personable Pioneers who seriously took on the role of mentor for their group.
- When asked to rate the top three areas of student growth from a list of nine possibilities, improved technical skills was the most common area indicated by over two thirds of the teachers (69%), while just under half reported student growth in inquiry and research skills (44%), project-based learning (42%), and writing (42%).
- Building students' technology skills appeared to somewhat overshadow deeper curriculum and learning issues. Teachers tended to describe the different things students were doing with technology, and less about the ways in which technology was enhancing learning or inquiry in a subject area or thematic context. Teachers often spoke enthusiastically about their students' technology use leading to greater motivation and enthusiasm in their classrooms. Much less discussion touched upon how these technological tools enhanced the learning process or the substantive quality of the final product.
- In general, teachers were pleased by the nature of the support they received from MetroLINC. While in the pre-program surveys almost half (48%) of the teachers indicated that "lack of funding and support" was a barrier to changing their teaching practice, only 27% indicated it was a barrier in their post-program survey. Teachers were generally very positive about last year's Summer Institute, finding the range of workshops helpful and greatly enjoying meeting and working with other teachers.

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BACKGROUND: GOALS AND ORGANIZATIONAL STRUCTURE OF METROLINC

MetroLINC represents a unique effort among the growing number of school technology projects: it builds on the city of Boston's commitment to equip all its public schools and guides the use of that technology in support of the state's newly created curriculum standards. Tying technology to standards-based education, MetroLINC puts into practice what many studies of technology integration have shown—that technology use and the reforms following from it have a greater chance of success if such efforts are tied to a strong curriculum. The project also brings together a number of other truths borne out by research and experience—that teachers need adequate support to adapt to change, that advocates or “pioneers” in schools can go a long way toward promoting a project among colleagues and deepening its use, and that urban and suburban schools even in geographical proximity can be remarkably separate without dedicated and concerted effort to strengthen connections between districts.

As a systemic initiative, the MetroLINC Project encompasses four major tiers in its organizational structure. At the highest, broadest tier (Level I - “Institutional Structures and Partnerships”) are the various organizations and organizational relationships that frame the project and determine many of its constraints and opportunities. At its core, are the MetroLINC staff within the main technology offices in Watertown and Boston, the two partnering school districts. The MetroLINC staff works in close collaboration with the technology offices in their districts, as well as ensure that MetroLINC efforts are coordinated and collaborative between their two districts. Furthermore, this core MetroLINC staff has been developing contacts and relationships with the various university and organizational partners that MetroLINC wishes to enlist in their efforts.

At the second tier (Level II - “MetroLINC Technical Support and Professional Development Opportunities”) are the MetroLINC staff in Boston and Watertown, and the

professional development opportunities and support they offer to participating MetroLINC teachers in the two districts. In Boston, the eight-person MetroLINC staff includes a Project Director, two facilitators who provide technical support and training directly to all MetroLINC teachers, four technicians who provide technical support for all MetroLINC related schools, and an administrative assistant. In Watertown, the two-person MetroLINC staff is comprised of a Project Director, and a Technology Specialist who provides priority tech support to the four MetroLINC schools as well as program and curriculum integration help to Pioneers and Adapters.

The two Project Directors are responsible for designing and directing all MetroLINC program efforts and ensuring close coordination of MetroLINC activities across the two districts. Both Directors are also involved in teaching selected staff development programs for MetroLINC teachers. In addition to an intensive 5 day Summer Institute conducted in July 1998, Boston teachers continued to participate in a range of teacher “call-back” sessions and technology workshops, while Watertown teachers could enroll in a wide variety of technology workshops and courses offered through MetroLINC staff in Watertown, in close coordination with the district’s Department of Libraries and Instructional Technology and the Assistant Superintendent for Curriculum.

A central strategy of MetroLINC is involving teachers in curriculum design and implementation. MetroLINC teachers are required to develop new curriculum units that integrate technology to support the standards, implement these units with students, and to post these units and activities on a MetroLINC web curriculum development and archiving environment. Lessons and instructional strategies become available to participating teachers and others in their district.

At the third tier (Level III - “MetroLINC Design Teams”) are the Pioneer-Adapter teams, who engage in this curriculum design and implementation. The Pioneer-Adapter team structure is a key component of the MetroLINC project strategy. In this model, a mentor teacher (“Pioneer”) works closely with a small group of teachers (“Adapters”) who are interested in adapting the Pioneer’s technology unit for their classroom.

Pioneers’ main responsibilities involve working with their Adapters who are modifying and adapting the unit for implementation in their classrooms with students. Pioneers have the option of implementing the unit again in their classroom if they wish.

This structure was more formally adopted in Boston this past year, and continues in the current new year. The design team structure was more loosely implemented in Watertown during the current reporting period, and has been more formally adopted this current new year. In Boston, there were 37 design teams, each headed by a Pioneer teacher, who worked with 1-6 Adapter teachers (total: 37 Pioneers and 115 Adapters.) In Watertown, there were 6 mentor teachers, working with other teachers in their district.

At the fourth tier (Level IV - “Classrooms, Teachers, & Students”) are the classrooms of these 158 MetroLINC teachers and the students who are engaging in MetroLINC curriculum units.

MetroLINC teachers included self-contained classroom teachers as well as building-level computer teachers, science teachers, and librarians. As a result, the MetroLINC teachers were a highly varied group who regularly worked with dramatically differing numbers of children. For the regular classroom teachers in Boston, class size generally ranged from 20 to 30, while teachers who worked with special needs populations has classes as small as six. In contrast, the building level specialists, such as computer teachers, librarians and media specialists, and science specialists taught hundreds of students in a given school year (as many as 650-700). The six Watertown mentor teachers had a similarly diverse range of classroom settings, ranging from classrooms of 15 students to teaching 700 students in a school.

In the current year, Year 2 of the MetroLINC project, the evaluation team from ROCKMAN *ET AL* has been investigating all four tiers of the Project structure.

METHODOLOGY

This evaluation used multiple approaches to capture information about the progress of the project. By looking at the same event through different data collection methods and by looking at the same ideas through different eyes, we can triangulate on substantive findings. Where we find consistency in the data and consonance in the ideas, we can feel confident in our findings. Where we find dissonance in the information from difference sources, we question the information and seek further clarification or other data sources.

This past year, the ROCKMAN *ET AL* evaluation team met with MetroLINC staff, teachers and students on 26 different meeting days spanning the full 12 months of the project's reporting period (July 1998- June 1999). These meetings included those with MetroLINC and district staff from Boston and Watertown to discuss project plans, activities and goals; classroom visits to 17 MetroLINC Pioneers and Adapters at six different schools, observations of group meetings of MetroLINC Pioneers and Adapters, and training and call-back sessions with MetroLINC teachers.

In addition, three separate studies were conducted this past year:

1. a pre-program and post-program written questionnaire administered to roughly 160 MetroLINC Pioneers and Adapters;
2. classroom observations and follow-up interviews with 11 Pioneers and Adapters from Boston and Watertown;
3. telephone interviews with 32 MetroLINC Pioneers and Adapters in Boston and Watertown

The different data sources addresses the four sets of major issues as follows:

Table 1. MetroLINC Research Plan

Data Collection Method	Meetings w/ MetroLINC & District Staff	Observat'ns of Teacher Institutes & Workshops	Pre- & post-program questionnaire	Classroom observations and visits	Phone interviews
I. Institutional Structures & Partnerships					
II. MetroLINC Technical Support & Training					
III. Teacher Design Teams, Mentorship & Collaboration					
IV. Classroom Practice					

Samples for Various Studies

Pre- and post-program surveys: During the July 1998 MetroLINC Summer Institute, a pre-program survey was administered to all MetroLINC teachers attending. A post-program survey was administered to MetroLINC teachers attending the May 25th 1999 Spring Celebration, with follow-up calls for a small number of non-returned surveys conducted by MetroLINC staff in the weeks that followed.

We analyzed surveys for each teacher who returned both a pre-program survey and a post-program survey. This sample consisted of 144 teachers: 134 from Boston (34 Pioneers and 100 Adapters) and 10 Watertown teachers. These 144 teachers represented 87% of the total sample of 166 MetroLINC teachers (out of possible 37 Boston Pioneers, 115 Boston Adapters, and 14 Watertown teachers.)

Classroom visits: In the fall and winter of this year, the evaluation team visited 7 MetroLINC schools (6 in Boston and 1 in Watertown) to talk with 16 Boston and Watertown teachers. The 16 teachers included 5 Pioneers and 6 Adapters in Boston, and 5 Watertown teachers, and represented 11 different MetroLINC design teams. These teachers were suggested by MetroLINC staff as teachers who would be willing to talk with the evaluation team, and who had begun MetroLINC units in during the fall and early winter months, and thus would have some experiences to report.

Telephone interviews: This spring, the evaluation team selected 38 teachers—12 different design teams of Boston Pioneers and Adapters, and 3 teachers in Watertown—to be interviewed by phone. Thirty-two teachers agreed to be interviewed (an 85% response rate). The teachers taught grades K-12, and represented 21 different schools (18 elementary schools, 2 middle schools, 1 high school).

The sample was selected according to a number of different criteria. First, the 12 different design teams in Boston represented the range of different curriculum areas featured in MetroLINC units, spanning language arts, science, and social studies. Mathematics, rather than being targeted by MetroLINC teachers as a primary focus in their units, was typically addressed within the context of science or social studies; thus no teachers were interviewed who had primarily focused on mathematics.

Second, within each subject area, design teams were selected to include both Pioneers who focused on particular software tools not only within a subject area but also with a certain curricular/content theme (e.g., use of the Internet to do research on marine mammals for science), as well as Pioneers who proposed broader, more “generic” approaches which tied a software tool simply to a subject area (e.g., use of word processing for producing science journals).

Several Pioneers were selected because they worked with special education populations, a student population addressed by approximately 20% of the MetroLINC teachers. One team was selected because it represented the single cross-district team in which Boston

and Watertown teachers attempted to have their students communicate and share classroom work in the MetroLINC unit.

Finally, we also were selective in whom we wished to contact within a particular design team. During our fall classroom visits, our evaluation team learned that there were many collaborations taking place between teachers who already knew each other, and worked in the same school. Given this information and our interest in studying the collaboration issue, we attempted to contact three members for each Boston design team (a “triad”): its Pioneer, one Adapter who taught in the same school as the Pioneer, and one Adapter who taught in a different school. In Watertown, given that adaptation of MetroLINC units with another Watertown teacher was not a strong priority in their MetroLINC work, evaluators interviewed only the Watertown mentor teachers.

A summary of the respondents in the studies can be organized as follows:

Table 2. Samples for MetroLINC studies

Method	Boston Pioneers	Boston Adapters	Watertown Teachers	Total
Pre-program & post-program surveys	34	100	10	144* (52 schools)
Classroom visits	5	6	5	16 Teachers (7 schools)
Phone interviews	10	19	3	32 (21 schools)

Profile of Participating MetroLINC Teachers

A diverse range of teachers participated in MetroLINC. Teachers were primarily in grades K-8, although they ranged from K-12. There were both new teachers with 2-3 years experience as well as those with more than 30 years in the classroom; the majority of the participating teachers in the 1998-99 school year are quite experienced veteran teachers, with half of them having 20 or more years of experience. Only one-eighth of the participants had been teaching for five years or less. Some were “generalists” responsible for teaching a variety of subject areas to their class, and others specialized in particular areas (e.g., science, social studies, computer technology, library) and taught hundreds of children in their school. About 20% of the teachers indicated that they worked with special education populations, such as students with significant physical, cognitive, and learning disabilities.

This diversity in teachers’ backgrounds is reflected by its pool of Boston Pioneers. Of the 38 Pioneers, 11 were computer, media specialists or librarians; 13 were “regular” classroom teachers; 7 were “subject matter specialists” and 5 taught classrooms of students with special needs and 2 taught ESL/Spanish students.

In addition, about two-thirds of the MetroLINC teachers (61%) stated in the surveys that they were currently involved in other school reform or curriculum reform efforts. More

than 90 percent of the teachers reported that they had a computer at home, prior to participation in MetroLINC. Teachers estimated that fewer than 20 percent of their students had access to a computer at home.

Institutional Structures, Strategies, and Partnerships

Boston MetroLINC staff works closely with their district's Office of Instructional Technology, while Watertown MetroLINC staff works closely with the Watertown Department of Technology staff.

Boston: Boston's approach was very strategic and highly leveraged. It connected participation in the program to increased classroom computers access by offering those teachers who met certain qualifications for technology skills, a chance to obtain a better ratio of computers to students—a rapid technology diffusion model—as long as they used the new computers for instructional activities in standards-based curriculum. MetroLINC offered support and leadership to move from a teacher-centered approach to computers (i.e., teachers mastering personal productivity skills) to a more student-centered approach (one that engaged students in using the computer for learning connected to the standards-based curriculum). The pioneer teachers were selected as both having a project to share and as being potential (or actual) teacher-leaders for their schools. The hope was also for more collaboration among teachers across buildings—and across the two districts, if possible.

Each MetroLINC teacher received as many as four new computers and one new printer as part of their participation, with hardware funding coming from local district funds. During this past year, each Boston school also received a “starter network” (computer lab, library, principal's office, and 4-8 classrooms, also acquired with local funds). However, MetroLINC teachers may not have received Internet access in their classrooms. In addition to computers, MetroLINC teachers also received a \$1,000 stipend and \$1,000 for supplies and software.

The MetroLINC project also drew upon two major technology professional development efforts in the district for which MetroLINC played a major role:

1. a Teacher Technology Competencies self-assessment test, and a set of workshops associated with the competencies. Of the 5 levels of technological proficiencies, all Boston teachers are asked to be at the Practitioner Level (Level 3) by 2001. This effort is being implemented by MetroLINC staff for the district; a similar competency test was also designed for principals, secretaries, and management.
2. a Coach/Coachee program, in which teachers agrees to coach five of their colleagues in the use of technology as a productivity tool funded through MetroLINC.

Both of these efforts feed directly into the MetroLINC project, by defining some clear requirements and pathways regarding technological skills and coaching fellow teachers with technology before teachers become eligible to participate in MetroLINC as Pioneers or Adapters.

Watertown: In Watertown, recruitment for MetroLINC teachers was more personal and opportunistic. Watertown, being a much smaller school district, enabled MetroLINC staff to adopt a more “high touch” approach (as described by a MetroLINC staff member), to seek out teachers already experienced with technology. As a district engaged in curricular and pedagogical reform for several years, both district administrators and MetroLINC staff in Watertown saw the project as a way to incorporate technology into the strategies they were adopting, both strengthening the constructivist elements of the curriculum while increasing the technology literacy of the teaching staff. Prior to MetroLINC, a number of the Watertown teachers had been involved in other inquiry-oriented technology projects with partner organizations, such as the Science Learning Network (a program involving six science museums working with partner schools around the country in which teachers made web pages for content-rich projects), or being part of a Massachusetts Lighthouse School (funded by Massachusetts Dept. of Education) to train other teachers in the state. The hope was that the MetroLINC project would be an opportunity for teachers to build on those previous technology-focused curriculum efforts, and further strengthen relationships with those partners.

[I got involved in MetroLINC at the very beginning.] I already had something in mind. I was finishing up with the SLN (Science Learning Network project with the Museum of Science). I did a web page, and two projects - they had carry-over from the work with SLN. MetroLINC complimented and greatly enhanced it. (3rd grade Watertown teacher)

Watertown teachers also belong to a significantly smaller pool of teachers, and teacher-leaders comfortable with technology were easily identified by project staff. As in many small districts, the same names often keep coming to the top for activities and new projects year after year. The hope was that these traditional leaders would recruit and prepare others to take leadership roles, while MetroLINC staff would identify and nurture new talent in the district as the year progressed, to tap for Year Three.

In contrast to their Boston counterparts who received up to four new computers through local city funds, Watertown mentor teachers received only the \$1000 stipend, plus \$200 for classroom expenses. MetroLINC staff also purchased a small amount of additional technology (e.g., cameras, scanners, printers, software) for Mentors’ projects as needed. Watertown adapters received neither stipend nor equipment, which increased the challenges of recruitment.

While Watertown was beginning to deploy clusters of four-to-six “computers on wheels” (COWS) in each building, and opting to put the newer, more powerful equipment in mentor teachers’ classrooms, most mentor teachers continued to rely primarily on their school’s computer lab. Thus, students’ access to computers remained basically the same in MetroLINC classrooms as it was in the rest of Watertown. All Watertown classrooms were wired to enable all teachers to have email and Internet access through a computer in their classroom.

CROSS-DISTRICT MEETINGS AND COLLABORATION

Representatives of the two MetroLINC project teams in each district met monthly on a regular basis, alternating the sites. The first set of meetings for the 1998-99 school year focused on status reports and progress of project activities and less on observations of what was working and not working regarding MetroLINC support and strategies. There was little sharing of agendas and activities, and a more formal relationship existed between the two district teams. Outside partners—such as university partners and others—did not participate in these meetings.

A fundamental task for each project director during this initial year was to determine how the MetroLINC project fit within the context of other instructional initiatives and school reform programs in each district, before being able to turn one's full attention to collaboration across the two districts. Part of the challenge in this collaboration is the considerable difference in scale between the two districts, as well as differences in the schedules, rationales and bureaucratic processes which operate in each of the districts. Furthermore, the MetroLINC staff in the two districts did not start at the same time, increasing the time to learn about each other's district, and to negotiate all the details of the collaboration and partnership. Finally, addressing the collaboration and partnering issues takes a good deal of deliberation, care and effort on the part of staff. As the year progressed, the two MetroLINC project directors made it an increasingly important priority to talk regularly, to check definitions of needs and solutions with each other, and to collaborate on specific activities regardless of size. The collaboration took, and continues to require, effort, care and deliberation.

The evaluation team became involved in early winter and participated in the meetings first as observers, then as meeting leaders for special issues. One meeting, in January, explored partnership issues and the development of a more collegial and collaborative effort. By the end of the meeting, project staff had identified several common projects that would commit cross-district partnerships and agreed on a new collaborative relationship that would share leadership and encourage more equal management contributions. A second meeting managed by the evaluation team reviewed the "demonstration school," an important element in the proposed project, and a strategy that was not being implemented as quickly and effectively as initially envisioned. The districts' leaders reviewed the project's relationship with its existing partner and concluded that developing further sites was premature before more tangible and clear benefits emerged from current efforts.

[The plan to create several demonstration schools in the districts was expected to more closely tie together university research, preservice education and teacher professional development. Implementation during the initial year was deliberate and modestly incremental. Through discussions with potential university partners this year, MetroLINC staff discovered that many of the region's universities often do not have as much technical experience and expertise as some leading K-8 schools. They also found

that schools, while interested in establishing a relationship with a university, may need to target their collaborative efforts on a specific area, such as literacy, that it works on with a university partner.]

Following these two meetings, MetroLINC work was conducted in a much more coordinated and collegial fashion, as expressed in the original proposal. The two project managers worked closely to plan for and carry out the 1999 Summer Teacher Institute, as well as approaching outside partners to explore potential relationships for Year Three. They also designed a new pilot project with a “call for new Pioneers” for an effort in tele-collaboration and communication between classrooms across the two districts.

At the same time, project managers have identified areas where it seemed wise to adopt different strategies in their districts. Both districts have recognized that many veteran teachers are skilled in technologies but may still find it difficult to be a mentor for other teachers. In Boston, the MetroLINC staff spent time in the late winter and early spring working closely with new Pioneers to help them refine their projects and prepare a large group presentation of their projects to potential adapters. Given the vast training needs, MetroLINC is a high-leverage strategy to identify and train teachers who will then play leadership roles in working with other teachers. In Watertown, the MetroLINC staff has presented the MetroLINC project as “peers pioneering together” rather than “masters mentoring others,” in keeping with the district’s efforts to promote more inquiry-based learning. Many Watertown teachers took advantage of MetroLINC workshops; 153 teachers who were neither Pioneers or Adapters took such workshops in the past year.

Similarly, the two districts have adopted different strategies for approaching higher education partners. In Boston, the chance to work in technology-rich schools seems sufficiently appealing and distinctive to higher education partners. Lesley College will be working in the Trotter school in the coming year as a demonstration site. In Watertown, a district that currently feels inundated by new district curricula; aligning district curricula with new Massachusetts Curriculum Frameworks, and new Massachusetts testing (MCAS), it seemed wise to downplay the technology emphasis and rather more “seamlessly integrate technology” into curriculum efforts. Watertown is now working on establishing relationships with a set of higher education groups by offering itself as a possible “Professional Development District.”

After attending the MetroLINC workshop on pre-service models at the MetroLINC 1998 Summer Institute, Watertown staff wrote and received a technology planning grant from the Massachusetts Department of Education in summer 1998 to begin work on this idea. This fall, Boston College, Harvard, and Lesley College have launched Project Open, which received a federal planning grant in Summer 1999, to further their approaches to pre-service teacher development in a collaborative fashion. This fall semester, the first student teachers will be placed in all five Watertown schools from the three graduate programs, and their respective faculty members will come out to the schools to supervise and instruct the student teachers.

One logistical challenge that still remains is that the two districts are operating on different yearly calendars for MetroLINC teacher participation. While both districts use the fall to identify new Pioneers and have an application process for selecting new Pioneers in December, they use the following months in a quite different fashion. In Boston, the district uses the late winter and spring to recruit adapters, to support Pioneers in their presentation of their projects, which they showcase in April to help match up newly recruited adapters with pioneers. Official assignments of design teams of adapters and pioneers are done shortly thereafter, and design teams use the Summer Institute as a critical time to plan together how Adapters will adapt their Pioneer's unit in their classrooms for the upcoming school year.

In Watertown, MetroLINC staff has used the late winter and spring for Pioneers to begin trying out their new units with students, with recruitment of adapters being more on-going throughout the spring and early summer. Consequently, many Watertown teachers come to the Summer Institute without Adapters, but use the time to further refine the units they may try again in the fall. MetroLINC participation for them winds down in December, with a new group of Pioneers being recruited in the winter.

MetroLINC staff acknowledge that Year Three's "tele-collaboration" pilot projects will need to match a school-year schedule similar to Boston. The yearly schedule differences also pose some problems for the evaluation process, since the beginning and planning of unit, evolution of units, and final "culminating events" for MetroLINC teachers occur at different times of the year in the two districts (in December for Watertown, and in May for Boston.)

These different "MetroLINC teacher years" seem to have stemmed from different MetroLINC staffing and recruitment timeframes in Year One. In Watertown, MetroLINC staff was hired in Fall '97, and thus work with Pioneer/mentor teachers were able to commence in the winter. In Boston, the regular MetroLINC staff was hired in Spring '98 (although recruitment for Pioneers and Adapters were done by acting staff in the winter), and thus true work with the MetroLINC teachers began in the summer.

There are clear advantages to each of the yearly cycles. For Watertown, MetroLINC participation allows Pioneers to experiment with their units in two rounds and with two different classes of students (during the Spring, and during the fall); it, however, limits participation of Adapters to only a half year. For Boston, MetroLINC participation allows design teams—both Pioneers and Adapters—to adapt, refine, and fine tune units over the course of a nine-month school year, with single or multiple classrooms of students. Starting this past year, MetroLINC participation for Pioneers in fact extends to more of a 16 month commitment (Feb - May), rather than a straight 12 month stretch.

Finally, despite the thoughtful efforts of both districts' MetroLINC staffs, some teacher resistance to cross-district collaboration still exists. Teachers in Watertown (as in Boston) highly prefer receiving training in their own school building or within their own district; thus, attending a summer institute in Boston seems somewhat of a hassle to Watertown teachers. The problem of traveling to Boston for training is further

heightened by the fact that cross-district teacher collaboration has not yet been established and proven successful, thereby making a Watertown teacher's question of "why should we meet in Boston?" more difficult to answer. True reciprocity is difficult, since the physical and technical facilities of smaller Watertown precludes its ability to host a 200 person teacher institute. Similarly, the sheer difference in numbers of teachers—152 Boston teachers vs. 14 Watertown teachers—makes Boston a more logical district for general MetroLINC meetings. As with many suburban districts, there is also some wariness or sense of caution for Watertown teachers about going into urban schools, due to a perceived sense of crime.

In Boston, MetroLINC staff encouraged a number of Boston teachers to explore the possibility of having students study about different kinds of neighborhoods (differences culturally, geographically, scientifically), and how cross-district collaboration could address both language arts (through use of email) and science (through cross-district experiments). Teachers, however, seemed reluctant to initiate such collaboration, since they were entering into a brand new project with yet unforeseen rewards and challenges even within their own school and district. There was only one instance of Boston and Watertown teachers working closely together in a design team; students from two classes communicated via email and visited one another in a joint field trip.

The MetroLINC staff has adopted several additional strategies in their outreach efforts this year that extend beyond the "call for teachers" MetroLINC application process. First, staff are nurturing natural connections among teachers that focus on common interests, such as special education teachers interested in Intellitools. Second, project staff specifically put out a call for participation in tele-collaboration projects that link classrooms and students across the two districts. Three such cross-district projects—a kindergarten life science project; a science learning cross-age collaboration; and a 5th grade social studies unit—will start in the coming year.

In the past year, MetroLINC made modest progress in establishing one school as a demonstration site in collaboration with a school of education. In this process, MetroLINC staff became fully aware of the difficulties of setting up a demonstration school, noting the benefits and liabilities of these relationships and the efforts required to create and sustain them. The notion of demonstration schools is evolving for the project leadership, and while hopes are high for productive partnerships, progress is slow. This coming year should include a careful look and some clear decisions about the expansion of the demonstration school concept as part of MetroLINC.

Furthermore, there has not been much concrete collaboration between MetroLINC schools and the project's partners around the Boston metropolitan area. While Year One plans had involved working with several different partners (e.g., Teaching for Understanding at Harvard, Make it Happen at Education Development Center, and the Museum of Science), differences between the partners and the MetroLINC staff arose concerning issues of scalability, cost, and technology focus. Another consideration has been the interest of current MetroLINC teachers in Language Arts and Social Studies curriculum, in contrast to the some of science and mathematics focused institutions that

had been identified as potential partners. The staff recognized the need for close match between the goals of project and each partner institutions' programs before investments are made—and they need an idea of how the program will influence and enhance standards-based teaching and technology use in the schools. For such partnerships to prosper, there needs to be assurance that each participant is gaining from the partnership—and probably that the schools are gaining more than they are giving.

TEACHERS' PROFESSIONAL DEVELOPMENT

As noted above, this year's MetroLINC teachers are an experienced and active group, with over half having over 20 years of teaching experience. Only one-eighth of the teachers have been teaching for five years or less. Most are currently involved in other school reform or curriculum reform efforts.

Reasons for participating in MetroLINC: In the pre-program survey, teachers were asked about the reasons they were interested in participating in the MetroLINC project. Almost all of the teachers (92%) indicated that they saw the project as a chance to learn new technologies. Three-quarters of the teachers saw it as an opportunity to exchange ideas with peers, with Pioneers being significantly more likely than Adapters to select this reason. This may be due to their awareness of their required mentoring role as Pioneers, or greater experience in working in a leadership role with colleagues.

About two-thirds of the teachers focused on the curriculum development opportunities of the project or said they were interested in learning more about instructional design and curriculum development, or wished to broaden their knowledge of curriculum.

About half said that they were intrigued in the approach of the project (51%) or that they were interested in school reform issues (45%). Only a handful of teachers (4.5%) indicated that they participated because they were required to do so.

Teachers' views of their own professional growth: At the beginning of the MetroLINC year, teachers were asked to select up to three items from a list of nine items concerning areas of greatest professional growth they expected to acquire through MetroLINC. A similar question was asked in the post-program survey at the end of the school year, regarding what areas of professional growth they felt that they had gained through MetroLINC.

The items most frequently noted as greatest areas for professional growth were associated with the technology aspects of the project, and its use with students for curriculum:

- Greater integration of technology in curriculum (pre-program 65% of teachers; post-program 74%)
- More effective use of technology with students (pre-program 71%; post-program 65%)
- Enhanced knowledge of technology (pre-program 56%; post-program 57%)

About a third of the teachers felt that an area of greatest professional growth was increased networking with colleagues. (pre-test 36%; post-test 38%)

For the most part, teachers' expectations for areas of growth were borne out by their MetroLINC experiences (based on comparison of pre-test and post-test figures) . The only exception was that teachers reported more growth in project-based instruction than they had anticipated in the beginning of the year (pre-test 26%; vs. post-test 43%).

In general, few teachers talked about curricular issues, but rather tended to focus on technology use. Other than some mention of the challenge of posting developed curriculum units on the web-site, only a handful of teachers specifically discussed curricular issues when asked about the strengths and weaknesses of MetroLINC.

Professional growth concerning technology: The qualifying staff development requirements to be an Adapter or Pioneer clearly led to a technologically skilled group of participants. Over 90% of the MetroLINC teachers said they had a computer at home. In their pre-program surveys, most teachers rated their personal skill and comfort level with computers as very high. Using a scale of 1 (little skill) to 7 (very skilled), the resulting mean was 5.6 Given such a high self-assessment rating in the pre-program surveys, teachers did not report a significant increase in their technology skills or personal comfort level over the course of the year.

While participants also felt generally knowledgeable about using telecommunications prior to MetroLINC, they did report a significant increase in their knowledge of telecommunications over the course of the year (pre-test mean=4.8; post-test mean=5.6). Despite teachers reporting relatively high comfort levels about using technology in their classrooms before MetroLINC, the Adapters showed a significant increase in their level of comfort in using technology in their classrooms as a consequence of participation (increasing from 5.2 to 5.8).

In the phone interviews, a number of teachers report learning a variety of new technology skills and applying them in their classrooms. Much of this learning occurred in the structure of MetroLINC's teacher-led design teams and the opportunities to develop as a teacher-leaders and contributing colleagues. Many commented about increased self-confidence and the satisfaction resulting from taking on responsibility and the concrete outcomes of a personally-created curriculum unit that integrated technology.

One thing about MetroLINC that was different [from other teacher institutes] was the requirement that we publish something that we can share. That was a good thing.....My goal was to complete a unit that was within the frameworks for the standards of the Boston school system. It was a different way of thinking. I had to focus on literacy goals, the different science standards, things like that...The type of projects I had them complete were targeted, far more formal, far more thought out. (K-5 computer teacher)

Collaboration and Mentoring

In their post-program surveys, teachers reported that they talk with other teachers more often. About three in four teachers (73%) talked with colleagues once a week or more. At the start of MetroLINC, only 59% of the teachers reported that level of contact. Adapters report a significant increase in the amount of contact they have with colleagues;

there was no similar increase for Pioneers. This may be due to the fact that a high proportion of Pioneers are building level specialists, who are likely to have already established a pattern of fairly high levels of interaction with colleagues in their building.

In Boston, design teams were formed by all new Pioneers and Adapters coming together for a major "Spring Showcase." Adapters had read the written description of all Pioneers' units, and selected three Pioneers whose sessions they would observe. At the Showcase, attended the presentations and then rank-ordered their preferences. Pioneers then review Adapters' selections with MetroLINC staff, and choose the Adapters who will be in their design teams. Design teams ranged in size from two to six members.

Teachers were most likely to choose and work closely with people they already knew, either within their own school building or in another school. At the same time, teachers did report increased frequency of communication with their colleagues, and noted the benefits of working on a shared project. There were also a number of reports of new relationships being formed across school boundaries, and the ways in which email and websites can support communication.

Case #1: "Will", a science teacher, Pioneer.

"My MetroLINC "team" comprises of 3 Adapters and me. We meet monthly to discuss our project, and more frequently on an informal basis. We have become very close friends, and great admirers of one another's work. My adapters are all superb classroom teachers. We also are in touch through e-mail on a nearly daily basis. I communicate regularly (weekly, sometimes more frequently) via e-mail with two other Pioneers to discuss our projects, ML, OIT, science, and life. I also keep in close touch with the two other Pioneers in my school through face-to-face contact regarding everything colleagues discuss and chat with the three second round Pioneers who are emerging from this building with some regularity. [In contrast with previous contact] the conversations are much more focused on technology-related issues than they would otherwise be.

[The reason I think our group was one of the most active design teams was that] I have a REAL project - one that has a genuinely important set of goals; a real, tested curriculum; and that elicits authentic use of the Internet resources. This led to greater dedication on the part of Adapters than could be expected from projects that have less defined goals. Then, as a result of some engineering on my part combined with my first point, and some luck, the team I assembled had wonderful chemistry. We really like each other and admire one another's work. Not only are our meetings not an inconvenience, we have fun together!

We applied and were accepted as a team for the Aquarium sabbatical in January...This experience gave my Adapters more grist for their project mills and further bonded us...We don't meet because we have to, we meet because we WANT to!

“Julie”, one of Will’s adapters, a special education teacher.

It has been going really well. “John” (another adapter in my group) and I get together and do a lot of planning together. Will gave us a packet and left it to us. We get together on Mondays -- John is at the “Walker” School, a 5 minute drive. We have meetings once a month. They are casual. We spend the first part with meeting and the other part just talking.

We meet [with one another] once a month and also meet more often. We see each other quite a bit. I just met with Will last night. We really meet at least once a week. I don’t meet much with “Roger”. He is a science specialist. I find it easier to plan with a classroom teacher (like John) to integrate the subjects. Roger just does science. Will provides great content, materials, hints and resources. He has nice connections with people at the aquarium and can get whale bones there.

On Mondays I am done at 11:45 AM, since kids have gym, lunch and library, and I have a full-time paraprofessional...So I asked permission from my principal to leave to go visit Will or John, and got it. On most Mondays I go to Will’s room or go to John’s room. John finishes at 1:15 so we can talk about what we each are doing. He just finished working with scrimshaw -- drawing on whale bones, and I also hope to do that with my students.

In my building there is one pioneer and 3 Adapters. One adapter is next door, and doing a project on the underground railroad. [Rather than talk about our projects] we have more discussions about teaching how to use the Internet. How do we teach them to find things when we have a hard time finding things.

For Boston teachers, collaboration was critical. While pioneers often knew some of their adapters, they rarely had the chance to work as deeply with someone else as they had this past year. The project gave a focus to the discussions held among the participating teachers. They talked about the technology and about the project they had together. Even in the same school, they had a reason for visiting each other’s classrooms, talking in the evening about the project. New relationships were formed and old ones strengthened.

Many of the Pioneers identified as active, mentoring teachers often spoke about all that they gained as a Pioneer and what they learned from their Adapters; they expressed the mutual benefit of the design team for all members of the group.

It’s given me more time as a teacher leader as far as leading a workshop or doing a large presentation in front of a large group of teachers. MetroLINC allowed me to step up and become a teacher leader. (Special Ed teacher, Boston Pioneer)

I've done some mentoring and collaborating with teachers that I might not have done otherwise... I've worked with other teachers who have said they'd like to do technology projects next year and I was able to brainstorm with them and get ideas from my projects. They might not have otherwise come to me for this kind of advice, but since they knew I was a Pioneer teacher with MetroLINC, they turned to me for this kind of help...MetroLINC has enriched the quality and the kind of collaborations. In the past teachers turned to me more to fix technology-related problems; now they ask for my help regarding the concept and the format of a technology project. (4th grade teacher, Watertown Pioneer)

Case #2: "Linda", a computer teacher, Pioneer.

I am the computer teacher at the school and I have a great interest in our students' learning to use technology as "a tool"...I firmly believe that students should be exposed to the power of the Internet to research and collect data. Having been a classroom teacher many years before being a computer teacher, I like to incorporate what I do with the classroom curriculum as much as possible. Hopefully, the students are learning to use the computer as a tool, and the Internet as a research vehicle. They are learning to collect data, and then do something with that data. Technology makes collecting data, doing research, easier in that it is as close as the nearest computer. Students seem to focus better using a computer, and they will spend more time at a task using a computer.

MetroLINC may have given me more of a focus in that I looked for sites to help my adapters and at the same time to help my fellow teachers....I have created a site, so that my adapters could go to there and possibly use some of these sites to help them with their adaptation and/or with integrating technology with their curriculum... I am now using the above site in my computer lab. It really has made my teaching easier.

Since I am the Pioneer teacher, it has been incumbent upon me to meet with those teachers adapting my project. I have 3 adapters. One teacher is in my school, and we meet daily. Because I am the computer teacher [for the school], I have worked closely with her to adapt the project. I have met with the other 2 teachers at my school several times, and have maintained e-mail contact. We have discussed ways in which they can adapt the project. We've had few "how to" meetings: how to make slide shows, using Kid Pix and ClarisWorks, how to use time lines, various web sites which can help. I had found and given to one of the teachers a list of books that went along with her adaptation. We've also continued to meet several times with the two other design teams whom we shared a room with at the Summer Institute, to hear what each other is doing.

It is different than ways I would typically interact with others from other schools, in that we have a bond that ties us together and because of this we made an added effort to keep in touch, particularly in meeting with each other. This normally would not happen. Because of MetroLINC, the 4th grade teacher and adapter of my project in my school, and I, presented our project at the MassCUE conference.

Several adapters also noted how they themselves assumed mentoring roles with other adapters on their team, or other teachers in their school:

... I needed to collaborate a lot with their homeroom teacher. The 2 of us looked at this project last year and decided to get involved. She had 4 computers and she's sort of a novice....Her kids did a lot of work on her 4 computers. I was able to guide them along too, and establish things so that we could work together.
(Computer teacher)

It's made me an advocate to the staff for technology, which I would not have done before. I taught 2 workshops with the staff this year...And I think I've been a real asset to the computer teacher. She's kind of old school and she isn't familiar with the new computers and software. Everything she learns from me she does with the other kids in the school who come to the computer lab and that sends a message to the other teachers...I never would have done the workshops if I had not had the computers in my room. I never would have been such a salesperson with other teachers and the workshops. Actually, a couple of my teachers have signed up to adapt what I'm doing for next year [as a new Pioneer.]
(3rd grade teacher)

A number of teachers voiced their interest in keeping up contact with teachers from other schools, but cited the constraints placed upon them of travel time, meeting time, amidst their busy teaching, meeting and lesson preparation schedules. Teachers felt it was highly advantageous to have design team members in the same school building.

Similarly, several teachers reported how the design teams within a building gave rise to a new, continuing support group, and allowed new teachers be recognized as teacher leaders in their school. The fact that MetroLINC is a district-wide effort in Boston and Watertown also seems to help with the coherence and continuity.

Collaboratively, because of back-up I've gotten, I will probably take more courses next year because I have support in the group I'm with. Three out of five members of my team are in my building. We look at each other's curriculum and plan together. One of us got a copy of a book with good Internet sites, so I got copies for everyone. MetroLINC has fostered this increased interaction.
(5th grade teacher)

(My area of greatest growth has been] my own self-confidence. I am feeling confident enough to teach teacher colleagues... I am in the limelight more. People come to me more. It has opened up more of my abilities in different areas... It is nice to have a more formalized thing. It is a huge school. Nobody knew anybody. Now things have jelled a lot. (3rd grade Watertown teacher)

[My collaboration with teachers] has not changed with all teachers, but with specific teachers. One teacher [an Adapter on my team] was relatively new. We didn't have much contact before, but we've gotten to know each other very well and developed a working relationship that we didn't have. I've done 2 projects this year with 2 other teachers (who are adapters on other design teams), that I don't usually do...Having other MetroLINC teachers in the building, other teachers became involved. Only 2 teachers in the building have not had some

kind of participation, so it's had a building-wide effect. The staff as a whole has really made big strides this year. (Library media specialist, Pioneer).

MetroLINC provided a lot more connections throughout the city of Boston. Just a lot of connections you wouldn't normally have made. A lot of us are taking classes together as a result of MetroLINC. People are sending me information on-line that I wouldn't have gotten. A woman sent me some information and I didn't even request it. She knew I was working on the freedom train project. A lot of times you go to a workshop and you leave. With this we really did have communication with one another...When people are talking to each other the children are going to gain. The Pioneers are recognized throughout the city. People didn't just stay in their own little groups. (4th grade teacher.)

Cross-Distinct Teacher Collaboration: There was only one known instance of cross-district collaboration between Boston and Watertown teachers and students. The design team consisted of an Adapter from Watertown (5th grade), and three Boston teachers in one school (a Pioneer who teaches 4th grade students with learning disabilities, and two Adapters: a 3rd-5th reading teacher, and 5th grade teacher.) In this unit, teachers focused on the children's book, *In the Year of the Boar and Jackie Robinson*, the story of a young Chinese-American girl who is a new immigrant to the United States. The book formed the basis for reading, social studies (immigration, history of 1947 America), and mathematics (statistical analysis of baseball scores; averaging). In addition to students from one Watertown classroom and three Boston classrooms exchanging email and student work, the classrooms planned two joint field trips to each other's districts—a trip to Chinatown in downtown Boston for lunch at a Chinese restaurant, and a baseball game with the different classrooms at a school field in Watertown. Children were very curious to meet their “keypals”, and exchanged descriptions of themselves before getting together.

Evaluators also learned of several other interesting cross-building collaborations. One had teachers from four different schools working closely together on a marine mammals research unit. A second “trio” of three design teams, having met during the MetroLINC summer institute, met again in the fall.

There was also one known instance of students mentoring one another across school buildings. One design team consisted of a Pioneer and two adapters in a middle school (specializing in social studies, English, and bilingual students, respectively), and a third adapter who was a vocational technology teacher in a nearby vocational high school. The middle school students went on a tour of the vocational high school, and the high school students ended up working on a regular basis as mentors to the younger students. Friendships seem to flourish, with the class of older students even coming to see their younger buddies play in a basketball game, which thrilled the younger students.

Case #3: “Marilyn” and “Rosa”**“Marilyn,” a technology teacher, vocational high school**

The project that we’re doing is that my students were peer editors for Courage Curriculum papers that the 6th graders wrote...My juniors and seniors have worked with them on a couple of occasions to edit their papers. The kids will have individual web pages on the web and my students are helping them to do that. My kids have never worked as hard for me as they did working with these little kids. ...[My students have] learned to work together and have an appreciation for people they wouldn’t otherwise consider peers. Taking responsibility because I can’t help them, but they’re the ones that have to go and work with the little kids.

“Rosa,” a middle school teacher of bilingual students

“Marilyn” has brought her students a couple times a month to work with our kids. Her kids were mentors. She has kids who are already being paid to create web pages. Her students translated some of the papers [we wrote] because eventually we want to have to have a Portuguese link (in addition to being in Spanish.) Our kids loved the high school kids. They’d say, “Wow, they’re cool! When are they coming again?”

In all of these cases, the design teams were led by strong, highly motivated, focused and personable Pioneers who seriously took on the role of mentor for their group. Physical proximity at the summer institute—with its opportunity for face-to-face interactions and social “down-time”—clearly encourages collaborations, informal and formal. The sense of ownership and camaraderie in the second round of Summer Institute (July ‘99) was clearly evident to all who attended, quite different from the previous year’s program.

Several teachers mentioned their pleasure at having met teachers from other schools within their district, or with another district, while others expressed their disappointment that additional cross-district contacts did not materialize after the summer.

Cross-district teacher collaboration is a needed area of attention for the coming year and is recognized by MetroLINC staff. For example, MetroLINC staff will be piloting several projects that specifically recruit teachers from both Boston and Watertown. The 1999 Summer Institute would seem to have offered an optimal opportunity for Watertown and Boston teachers to become acquainted for Year 3, and for design team members to begin working with one another. Attending the Summer Institute was a requirement for the 113 Boston teachers participating in MetroLINC, while about half of the 41 Watertown teachers attended, since attendance is strongly encouraged, though not required, for Watertown teachers. The Watertown teachers were again largely outnumbered by the Boston teachers. And since Watertown’s process for identifying and matching Adapters and Pioneers seems to be done on a more personal and on-going basis

(a less formal application process than Boston), few Adapters attended the Summer Institute.

Unlike last Summer's Institute, a primary focus of this year's institute was allowing design teams to work together to plan their units, given the precious little time there is once the school year starts. Unfortunately, this also minimized the amount of time Watertown and Boston teachers could potentially interact. Unlike last year, in which Watertown teachers were assigned to a Boston Pioneer, for purposes of informal collaboration, no such assignments made sense this year, and Watertown teachers were assigned workspaces but with no collaborators.

For a variety of reasons—such as differences in hardware requirements (Watertown teachers tended to use Macs while many Boston teachers use PC's) and delays in getting a final list of attendees from Watertown—most of Watertown teachers shared rooms only with other Watertown teachers. While some of the Watertown teachers shared rooms with Boston teachers, the two groups of teachers were usually working on topics not related to each other. For example, a Watertown Pioneer focusing on music shared a room with a nine-person design team from Boston focusing on mathematics; while a two-person design team from Boston focusing on music shared a room with three Watertown teachers focusing on literature and other topics.

A few Boston Pioneers heading regular design teams also were interested in participating in one of the three tele-collaboration projects, and for scheduling reasons, the three tele-collaboration projects across the two districts were held on the day following the three-day MetroLINC Institute.

There were, however, several poster sessions in which both Watertown and Boston teachers had an opportunity to present and talk with others about their MetroLINC projects, as well as a “birds of a feather” session, in which teachers were encouraged to discuss in small groups across the two districts possibilities for tele-collaboration. It will be interesting to see the extent to which contact and potential relationships cross-district emerge from the Summer Institute.

One veteran teacher from Watertown, offered a wise, “big picture” view of the process, regarding the first round of MetroLINC teachers:

I think because this was the real beginning of MetroLINC, the kind of cross-system curriculum wasn't as well developed as they had hoped. I'm hopeful that that [The Boston and Watertown school connection] will expand. It's great to have other teachers involved and it not just be theoretical. The teacher I'm mentoring has already connected with people in Boston for her projects. So these kinds of collaborations should be very productive. But it takes awhile; it takes at least three years for a project like this to get up and running, so I'm glad this is a five-year project.

Time: Time is always a critical feature in staff development and school change, and this project is no exception. Many teachers who chose to participate in MetroLINC

were already actively engaged in other curriculum and technology projects in their school or in the district, and it was sometimes difficult for Pioneer teachers to devote as much time to collaborating with their adapters and other Pioneers as they would like.

In the post-program surveys, teachers were asked for what they viewed as barriers to changing their teaching practice. Only two stood out as critical:

Lack of time (62.5%)

Inadequate time for planning and implementation (64%)

Time is the significant element in teachers lives—and finding time to learn and to plan new curriculum efforts, particularly as part of a teacher team, that take advantage of technology is easily identified as the central barrier.

We don't have time built into our day at school to meet. We met after school.
No chance to really interact with other adapters who could have suggestions.
(7th grade teacher)

There was not enough opportunity to meet as a team during the school year.
Hopefully next year the upgraded MetroLINC web site will allow for better communication among team members. (3rd grade teacher, Pioneer)

FINDINGS

COMPUTER ACCESS AND TECHNICAL SUPPORT

Survey data reflect the infusion of computer hardware in Boston MetroLINC classrooms. The average number of computers in classrooms went from just about 2 in the school year prior to joining MetroLINC to almost 5 on becoming a MetroLINC teacher. This change was statistically significant and quite meaningful to the participating teachers and classes. Changes were quite dramatic for Pioneers as well as for Adapters (Pioneers increased from 2.7 to 5.8 computers in their classrooms. Adapters increased from 2.0 to 4.7 computers).

Several Boston teachers, having received up to four new computers for participation in MetroLINC, reported how the project has dramatically transformed their classrooms, enabling students to use computers for learning key subjects. Prior to MetroLINC, some teachers only had one computer in their classroom, primarily used by the teacher. In contrast, the provision of four computers through MetroLINC enabled teachers to create whole-group and small group computer activities for students, and they could more fully incorporate the use of the computer in student projects and assignments.

I was pleased that I received new computers to use with my students. I can't stress how important it is to actually use them in class. Literally I've come from the 18th century to the 21st century in a year. Over the last 5 years I have taken 8+ workshops in computers, until I had them in my class it was to no avail. (5th grade teacher)

For other teachers, the four new computers represented not only a quantitative but a qualitative leap in what they had available to use with students:

Before I got the grant I had Apple IIe computers. They were very limited, and limited what I could do. (K-3 resource teacher).

This awarding of computers directly to teachers who participated in MetroLINC compliments the distribution model of the Boston Public Schools LINC technology plan in which all computers distributed to schools go to teachers who have completed various levels of professional development. This is in contrast to school building-initiated efforts, such as business partnerships and writing other grants, in which school-site leadership decides how computers are allocated.

Similarly, MetroLINC teachers can now call directly upon the technical and the teacher support staff of Project, rather than relying on district technical staff assigned to a set of schools. The vast majority of Project teachers in both Boston and Watertown were very pleased with the quality and timeliness of support they received from MetroLINC staff.

The addition of computers has created very different looking classrooms and resulting student activities. Thus, the MetroLINC “treatment” for Boston classrooms is undeniably a combination of additional classroom computers AND the training and obligation to implement a curriculum unit based on the standards integrating technology.

The participating teachers in Boston may have been knowledgeable about using computers, but have been hardware poor. In Watertown, the teachers were not able to increase their access to computers within their own classrooms, but remained largely tied to the school’s computer labs for student use. Consequently, teachers’ motivations and the consequences of participation may have been very different there.

Last fall, there was a concern by Boston MetroLINC staff that the awarding of four computers to not only each Pioneer but each Adapter as well would diminish an Adapter’s interest to apply to be a Pioneer. Thus, a decision was made to award only up to two new computers to Adapters this coming school year. As it turns out, MetroLINC staff’s concern about the lack of external motivation for Adapters to reapply—having “maxed out” on new MetroLINC computers—was surprisingly unwarranted. As further evidence of teachers’ strong sense of the personal and professional rewards of being a MetroLINC Pioneer or Adapter, 5 of the 37 Pioneers for Year 3 are returning Pioneers and 13 are from last year’s Adapters. This high turn-out of returning MetroLINC teachers is a testimony to the positive benefits teachers see from the Project.

CLASSROOM USE AND STUDENT IMPACT

Number of students reached through MetroLINC: As noted in the project report (May 1999), MetroLINC staff estimated that the potential number of Boston students reached through MetroLINC is 3662 (Pioneers working with 882 students; and Adapters working with 2780.) These numbers were based on calculations of figuring out whether participating teachers were special education, regular education, or bilingual teachers and multiplying those numbers by the average class sizes for those types of classrooms (14 students per special education class; 27 students per regular education or bilingual classroom). In Watertown, each of the three building level specialists in the Hosmer school may have worked with up to 600 students attending the school, plus an additional 20 students of one regular classroom teacher in the Lowell school. Thus, the total figures of student impact offered in the report could be calculated as 4,273 students across Boston and Watertown.

This figure may be a conservative estimate. In our post-program survey, teachers reported the “number of students using technology through your MetroLINC project.” For the 84 Boston teachers whose responses were 30 students or fewer (likely to be the special education teachers, regular and bilingual teachers) the total figure was 1,705 students. For the 42 Boston teachers whose responses ranged from between 36 and 650 students (likely building-level specialists), the total was 5,850 students. Obviously, some students that a building level specialist may work with will overlap with a regular classroom teacher’s count of students. Without a building-by-building and teacher-by-

teacher analysis, it is impossible to determine the actual number of students reached by MetroLINC this past year. However, the maximum figure of 7,555 students reached in a single year through MetroLINC (knowing that there is some overlap in students reported by various teachers within a single school building), is quite impressive.

Classroom Resources: As noted above, the most striking change in classrooms was the increased availability of computers in Boston, often going from only one computer for the teacher to four computers serving as student work stations. In examining changes over time for classroom resources, for teaching approaches, and for assessment strategies, the primary statistically significant findings about teachers' classroom practices concerned the kinds of resources used.

Table 3. Resources used in Classrooms

Resources	Pre-program Classroom Use (Mean)	Post-program Classroom Use (Mean)	Statistical Significance
Textbooks	P = 2.06 A = 3.37	P = 2.25 A = 3.04	-- --
Teacher-developed materials	P = 4.22 A = 4.05	P = 4.24 A = 4.09	-- --
Other print materials	P = 3.29 A = 3.73	P = 3.74 A = 3.67	-- --
Computers	P = 4.48 A = 3.67	P = 4.45 A = 4.40	-- p < .000
On-line telecommunications	P = 3.15 A = 1.55	P = 1.84 A = 2.50	-- p < .000
CD-ROMS	P = 3.61 A = 2.32	P = 3.77 A = 3.33	-- p < .000
School library	P = 2.19 A = 2.60	P = 2.03 A = 2.45	-- --
Classroom visitors	P = 1.52 A = 1.33	P = 1.87 A = 1.64	-- --
Video and/or ITV	P = 2.30 A = 1.56	P = 2.37 A = 1.80	-- --
Field trips	P = 1.25 A = 1.21	P = 1.25 A = 1.16	-- --
Camcorders	P = 1.28 A = 0.54	P = 1.32 A = 0.64	-- --
Videodiscs	P = 0.42 A = 0.40	P = 0.38 A = 0.31	-- --

(6 point scale: 0=never; 1=once a month or less; 2=few times a month; 3=weekly; 4=few times a week; 5=daily. P=Pioneers; A=Adapters)

Prior to MetroLINC, and continued throughout the MetroLINC year, teachers are using a variety of instructional resources in their classrooms on a weekly basis, including teacher-developed materials, textbooks, and computers. Quite logically, the Pioneers report a higher level of use of technology prior to MetroLINC (e.g., computers, CD-ROMS, video or ITV) than do the Adapters. Conversely, Adapters report slightly higher use of

textbooks and visiting the school library as compared to Pioneers. We found that Adapters significantly increased the amount of computer, on-line telecommunications, and CD-ROMs as a consequence of participation in the MetroLINC project.

Teaching Approaches: Teachers did not report any fundamental changes in the kinds of instructional strategies and methods they used in their MetroLINC classrooms. While we do know that computers are being used more frequently for student learning, participating teachers were already using a range of teaching methods at least weekly, such as small group instruction hands-on activities, group or individual projects, student-centered activities, whole-class activities, individualized learning, and interdisciplinary assignments, and continued to do so during their MetroLINC year.

The only statistically significant change reported in classrooms was for Adapters, in their decreased use of teacher-centered activities.

Table 4. Teaching Strategies in MetroLINC Classrooms

Teaching Approaches	Pre-program Classroom Use (Mean)	Post-program Classroom Use (Mean)	Statistical Significance
Small group instruction	P = 4.11 A = 4.19	P = 4.05 A = 4.13	-- --
Hands-on activities	P = 4.18 A = 4.08	P = 4.18 A = 4.13	-- --
Group or individual projects	P = 4.18 A = 3.44	P = 3.76 A = 3.33	-- --
Student-centered activities	P = 4.03 A = 3.84	P = 4.12 A = 3.79	-- --
Whole-class activities	P = 3.68 A = 4.02	P = 3.73 A = 3.96	-- --
Individualized learning	P = 3.57 A = 3.72	P = 3.78 A = 3.87	-- --
Inter-disciplinary projects	P = 3.62 A = 3.31	P = 3.74 A = 3.45	-- --
Portfolio assessment	P = 2.42 A = 2.39	P = 2.67 A = 2.42	-- ---
Teacher-centered activities	P = 2.76 A = 3.17	P = 2.93 A = 2.75	-- p < .007
Lectures	P = 1.97 A = 1.58	P = 2.03 A = 1.60	-- --

(6 point scale: 0=never; 1=once a month or less; 2=few times a month; 3=weekly; 4=few times a week; 5=daily. P=Pioneers; A=Adapters)

Assessment Strategies: As with the instructional strategies, teachers are currently using a range of assessment strategies in their classrooms. Among the strategies they are using on at least a weekly basis include: class participation, teacher-developed materials, projects, and written homework. Among the things they are not using frequently include: portfolios, conferences, short answer tests, essays, and packaged tests. Only about half of

the teachers report using portfolios. There were no statistically significant changes in the kinds of assessment teachers reported using, due to MetroLINC.

Table 5. Assessment Strategies used by MetroLINC Teachers

Assessment Strategies	Pre-program Classroom Use (Mean)	Post-program Classroom Use (Mean)	Statistical Significance
Class participation	P = 4.42 A = 4.45	P = 4.45 A = 4.64	-- --
Teacher-developed materials	P = 4.08 A = 3.65	P = 4.03 A = 3.75	-- --
Projects	P = 3.14 A = 2.62	P = 3.42 A = 2.85	-- --
Written homework assignments	P = 2.74 A = 3.54	P = 3.10 A = 3.69	-- --
Portfolios	P = 2.71 A = 2.80	P = 2.77 A = 2.57	-- --
Conferences	P = 1.94 A = 2.24	P = 1.97 A = 2.29	-- --
Short answer tests	P = 1.59 A = 2.17	P = 1.81 A = 2.20	-- --
Essay tests	P = 1.43 A = 1.59	P = 1.60 A = 1.50	-- ---
Packaged (ILS, SRA, etc.)	P = 1.14 A = 1.17	P = 1.39 A = 1.15	-- --

(6 point scale: 0=never; 1=once a month or less; 2=few times a month; 3=weekly; 4=few times a week; 5=daily. P=Pioneers; A=Adapters)

Standards-based curriculum: In the post-program survey, teachers were asked, “How would you rate the amount of time your students use computers for standards-based curriculum now versus last year?” Possible responses were offered on a 7 point scale, where 1 indicates “no change”; 4 = “increase some”; and 7 = “increase a lot.” Teachers reported a substantial use of technology for this purpose, with a mean of 5.5 on the 7-point scale; and 57% of the teachers rating the change as a 6 or 7.

The salience of the technology in the MetroLINC classrooms is also indicated by teachers’ common responses of how the biggest changes in their classrooms have been a “quantitative” increase in technology use:

- there are more computers now for student use;
- more students are able to use the computers now;
- students are using the computers more often.

For example, a teacher’s typical response might involve: “I now have four computers through MetroLINC. The students are using the computers for a MetroLINC unit involving writing. The students love using the computers and are very motivated to use them. The students are writing more, using the computer.”

Potential Areas of Increased Student Learning: In keeping with the Boston and Massachusetts curriculum frameworks, which emphasize the importance of students

creating original products and presentations, MetroLINC teachers tended to focus on technology tools—such as word processing and multimedia presentations, and to a lesser extent, data bases, spreadsheets, and graphing tools. Many teachers reported projects in which students directly used the Internet as an information resource for student research.

A variety of subject areas were addressed, with a predominance of units being in the areas of language arts and social studies. A few groups worked in science, but mathematics tended to be integrated into curriculum units in other subjects, primarily for measurement and data collection. Pioneers who had proposed technology tool use within a more focused content area (e.g., doing science research on marine mammals; writing about issues of personal courage), seemed to have a greater depth of collaboration and communication with their Adapters, than those Pioneers who proposed technology tool use in a more general subject area, without content or thematic focus (e.g., use of word processing and publishing tools for language arts; use of electronic portfolios in science).

In the post-program surveys, teachers were asked to rate the top three areas of student growth from a list of nine possibilities. Improved technical skills was clearly the strongest change over the year. A second group of outcomes included writing, inquiry/research skills, and project-based learning. While the remaining choices—self esteem, collaboration, presentation skills, knowledge of subject area, and cross-disciplinary work—did receive some votes, they were grouped at a much lower level.

Improved technology skills(n=100) 69%

Writing (n=60) 42%

Inquiry and research skills (n=63) 44%

Project-based learning (n=66) 42%

Self esteem (n = 39) 27%

Collaboration (n=34) 24%

Presentation skills (n=32) 22%

Knowledge of subject area (n = 34) 24%

Cross disciplinary work (n = 28) 19%

Building technology skills somewhat overshadow deeper curriculum and learning issues in our phone interviews. Teachers tended to describe the different kinds of things students were doing with technology, and less about the ways in which technology was enhancing or deepening particular kinds of learning or inquiry in a subject area or thematic context. Teachers were likely to talk enthusiastically about their students technology use leading to greater motivation and enthusiasm in their classrooms. To some extent, teachers talked about how word processing makes students' written work more legible (as compared to handwriting), and coupled with multi-media tools and graphic packages, make student products much more polished and professional looking. Much less discussion touched upon how these technological tools enhanced the learning process, or the substantive quality of the final product.

The biggest change since I've used the Internet is having the kids have the access and seeing how much they enjoy it. They're reading more about what they're

finding on the Internet. They have to read it before they print it and tell me how it will help them with their research. The downside is I've had students get frustrated with not finding what they want, but for enhancing and motivating student learning it's (the Internet) been wonderful. (Computer teacher, Pioneer)

Students want to write more. Getting kids to write has always been a struggle for me. but now my students have seen me use technology and they are wanting to use it too. They are now writing , even drawing... Students are more eager to edit. They are willing to make corrections to get a chance to get on the computer and type it. (1st grade teacher, Pioneer)

[My students made a PowerPoint slide show to show what they were learning in social studies. Compared to what I would have done before MetroLINC, this is] similar content, but they wouldn't have had an attractive product or a permanent record of the work. Motivation is increased to do work - they like the way it (their product) looks. There's something very satisfying about having their work come out of the computer. They also share ideas better when they see their classmate's work on the screen. "Where did you get that graphic? Where did you get that font? Oh I do like the way that large type looks." Students see something and realize they can do it and try it. It is very satisfying. (5th grade teacher)

It is easier to edit pages that are typed. They could see better what they wrote. This is a big issue. Because they could immediately see what was written down, they were much more likely to be able to revise and improve it. (5th grade teacher.)

Many teachers also say that their own areas of greatest professional growth are in technology and this is either reflected in, or perpetuated through, what they see the students gaining as well. It may be that this is the change that Boston teachers see since they are in their first year of having greater student computer access, thus they are building technology skills for themselves and their students.

It may be easy, however, to underestimate the full educational impact of these technology-based experiences for students and teachers. One middle school social studies teacher enthusiastically described how students were now giving multimedia presentations of their work. When asked, "how was this different from what normally happen in your classroom, before MetroLINC?", the teacher responded,

My students are largely bilingual kids. Before this, to give a presentation, students would write out their notes on little index cards. It was difficult, and very nerve-wracking, for them to stand up and present for even one minute to their class. Now, I have students who can stand up and give a 20 minute presentation, showing a multimedia slide show of their work that they had worked hard on for weeks.

It's also been really difficult for me to get written books and resources for my students to do research. So to be able to get up-to-date information and resources on the Internet has just been wonderful! The Internet really levels the playing

field, since it lets my kids have information and use technology for project the way more well-to-do, non-minority kids would typically have.

Several teachers talked about the value of being able to have students do research on the Internet. The Internet greatly expanded the kinds of topics students were able to research, in class-wide projects. Teachers were able to find topics that were personally relevant to students, or that had a sense of immediacy that was compelling.

Case #4: Three elementary school teachers with student Internet projects

The 4th graders did a project on family connections which involved them doing some research on their family background, and they used the Internet to conduct a fair amount of that research. In my classroom this is the first year that we were connected to the Internet. The MetroLINC project I was adapting to started off being on Ellis Island the history, and tying that into the history of students studying Ellis Island. We wouldn't have been able to shadow that project as well had we not had the Internet access...They learned a lot about the family backgrounds. I learned a lot about them. It was surprising to find how many of them speak more than one language and how many of them have traveled so extensively. They were able to put their family tree in more perspective. A lot of them didn't know what state their grandmothers came from. They gathered information about earlier generations in their families. One student found that he was related to Harriet Tubman. They got more of a perspective of the United States. It broadened their thinking. They gained an appreciation for the diversity that they had amongst themselves. (Computer teacher)

My students worked on an underground railroad project. It's called a freedom quilt... They worked on the Internet on a Hyperstudio project where they talked about different aspects of the underground railroad such as conductors, passengers, stations. They worked in groups. Two people might have been assigned Harriet Tubman and then another group might have researched stations on the underground railroad and then they put it together on this Hyperlink format. All of their work came together as one unit [we studied many stations along the Ohio River.] (What made these activities successful?) One is they're all African-American. That gave it more ownership for them. The fact that there are so many sites for the underground railroad here in Boston and they knew many of the sites. They'd say, "That's around the corner from me." I think that the fact that people were escaping slavery. None of them knew that slaves could be returned from free states by bounty hunters. That was a powerful moment for them. (4th grade teacher)

Case 4, continued.

The main project I was doing [with my first graders] was around the weather. During last summer I tried to find other 1st grade teachers around the world and I was able to make some links with England, Australia, and Alaska. Every day we would get an email a couple times/week telling us what the weather was in that particular place . . . At the very beginning we started noticing that weather was different depending on where you were in the world. Then the hurricane came and we were able to track the weather on the satellite feeds. [Weather.com was a web site we used daily]...This year has been different for me in many ways. Now I have computers integrated into my classroom. Being on-line in my room. If we need to suddenly change something because there's a tornado in Kansas, we stopped what we were doing. I didn't have to go to the computer lab. I didn't have to schedule the time. The immediacy. Having the computers to explore something pertinent...The stretch has been for me to look at the Internet and not just explore it for my own self. Getting information for cross-referencing and how to put things together [for my students.] I'm noticing things a little bit more. (1st grade teacher.)

Some of the most dramatic accounts of the impacts of MetroLINC technology upon students are voiced by teachers of special needs students, and how software coupled with assistive devices have radically augmented the learning possibilities in their classrooms

Case #5: "Eva" and "Susan", teachers with special needs students**"Eva", a teacher of special needs children, ages 4-8 that are multiply handicapped. Pioneer**

[Eva has 6 students. Five out of six are in wheelchairs; one is ambulatory. Children are functioning cognitively from 3 months to 2 years of age. The students have a variety of disabilities, all are non-verbal, several are fed via a G tube. 3 out of the 6 have active seizure disorders. She extensively uses augmentative communication devices.]

The biggest change is having two computers on carts...Before only one child could be at the computer at a time. Now we have 2 or 3. They are switching during the day. [The effect on the kids] is phenomenal. I now do things that require two switches. These kids have severe cognitive delays, but they are motivated by the computer. They are working really hard to figure out what do [following the directions]. [With] these new Macs we can record our voices right onto them. We have different thematic programs where they can explore more freely. There's lots of repetition. But kids can move beyond cause and effect into exploration. Say they may have a sound they like to hear - there is a preferred and a non-preferred sound. Instead of randomly pressing a switch -- I have a girl who wants to hear the preferred sound. She has to pay attention to figure out where to place her hand to hear the preferred sound.

Case 5, continued.

I am now focusing on... filling in the in-between from single switch access (where students see something happen) to the functional -- communicative and educational access. Having students intentionally move left to right, and right to left to create responses. Sequencing. Press the switch and have it be understood and functional and more than entertaining. I am doing emergent literacy, and with voice output devices I can see parts of my kids I didn't know existed before. What they can do is so much more because of these assistive devices. I have standards for my kids which is access to literature. People make remarks. How can I have standards for these kids? But that is a standard. Text is all around us. My students enjoy being read to. Is it a form of communication? Absolutely.

Susan, 3rd grade teacher with inclusion classroom, Adapter

(What do you think your class would be like without the computers?) It would be disastrous without them. I do some differentiated teaching. Kids who need that as a way to communicate. One student learned to talk in English this year. He loves the computer. He can say a whole sentence now. He gets out, "Can I work on the computer?" slowly. Last year I was lucky to get a grunt out of the kids. (What is his native language?) His family speaks Spanish at home, but he never spoke it. He is a receptive learner. For him he is now motivated to speak.

Another student moved away this year. He was very upset. We email each other and keep in touch that way. I have a parent - we email each other every other day.

Teachers' Reactions to MetroLINC Staff Support and Programs

In general, MetroLINC teachers were pleased by the nature of the support they received through the MetroLINC project. As noted above, Boston teachers were thrilled at receiving up to 4 new computers for use in their classrooms. Very few teachers reported having any significant delays in having new computers delivered to their classrooms. A few teachers said that it would be helpful to have laptop computers for teachers to use at home, if needed, even if as a loaner program. Unfortunately, district policy does not allow the purchasing of laptops with City funds.

Unlike in the pre-program surveys in which almost half (48%) of the teachers indicated that "lack of funding and support" was a barrier to changing their teaching practice, only 27% indicated it was a barrier in their post-program survey.

There were relatively few criticisms about getting the computers hooked up, and about the way technical questions were handled by the help desk. A few teachers wished for more on-site technical assistance. Although every school building in Boston has

Internet access in both the library and the computer labs, some teachers did mention that their not being connected to a network posed some problems in communicating with colleagues, and by not being able to access the Internet for student research and other projects easily in their classroom.

Most teachers were positive about the nature of the support they received from MetroLINC staff, while a few teachers did express that they needed more assistance in carrying out their classroom units than they received:

Excellent ready support, only a phone call away. Good follow through. (Adapter)

Once regular staffing was available with Lisa Breit coming on -- nothing was impossible. Our wish list often came true. We got real help from her. With SLN they would ask you what you wanted and they would do it [tech stuff] but then you didn't know how they did it [so you couldn't do it on your own the next time.] The Technology Challenge people tended to teach more than to do stuff. They show how and help you how to do it...Lisa continues to keep me going and keep in touch with me. She doesn't let me fall off the face of the earth. I get e-mails from her (Watertown Pioneer)

I needed more support on the part of the tech experts - I really felt like I had a very difficult time doing my project on my own, not with the sufficient training. I really believe I needed more training in order to complete this project. (Adapter)

I think a monthly/bi-monthly "check-up" by the OIT staff via flyer/phone to see if there is any technical support that can be given to the Pioneers/Adapters. (Adapter)

In general, teachers were very positive about last year's Summer Institute. They found the range of workshops given helpful, and greatly enjoyed meeting with and working with other teachers. A main suggestion was for there to be more meeting time for design teams to work and plan together—a suggestion that was taken seriously by MetroLINC staff and informed their modification of the Institute held in July 1999.

Teachers seemed to think the workshops offered during the year were generally quite helpful, and preferred those that offered hands-on experiences rather than dissemination of project information. Some teachers offered some suggestions of further topics or software product they would like addressed, such as how to create a web site, additional workshops on Hyperstudio, and the use of digital cameras.

The evaluation team observed one of the after-school workshops on Hyperstudio last winter. While the presenter focused clearly on how the tool worked, and allowed a good amount of hands-on time for teachers to work with the tool, there was no discussion inviting teachers to talk about whether they had prior experience with the tool, or what their interest, thoughts or plans were with the tool. Thus, the workshop was handled much more as a "learn to use a technology tool" workshop for educators, than one that also encouraged teachers to think about how they might use such a tool. Another possibility for follow-up sessions on a tool could focus on ways teachers might assess

students' work produced with such a tool (e.g., how can teachers critique a PowerPoint presentation—what makes a good one superior to a more superficial one? In what ways can teachers look beyond an attractive and professional looking presentation, to know if it contains the kind of student thinking and analytical research that one is striving for?)

A few teachers offered some practical, logistical suggestions, such as offering more varied meeting times to accommodate teachers with different weekly schedules, having a well-equipped meeting location easily open after hours, or Pioneers having a small budget to be able to serve refreshments to attendees.

A handful of teachers mentioned that they would rather spend their time meeting with their design teams, or with a number of different design teams, rather than at a required “call-back” session.

I'd like more scheduled formal time to meet with adapters. It should not be left to whenever we can get together. The meetings they (adapters) went to were OK, but time to meet with the team would have been just as helpful and probably more helpful. They should open the OIT building to have Pioneers and Adapters meet - a location with equipment. Here are the blocks of time the labs are available -- these few weeks. Sign up for time for groups to meet. They require that groups meet 2 times as a group. Three or four times would be better. (Pioneer)

I think it would be nice if at some time in mid-year they could get the whole group or half the group or the people from the summer could get together and talk and share -- not showcasing - but interacting (e.g., sharing problems getting on the web.) It is motivating and rejuvenating and you start feeling more of a bigger thing, a larger thing. The interaction at the summer institute was superb. (Pioneer)

We tried and had some success with cross team meetings. I think I would have liked to pursue that more. It was great for ideas and sounding boards. (Pioneer)

Several of the Pioneers and Adapters voiced that they wished the MetroLINC project had imposed more structure on the times and frequency that the design teams were to meet.

More deadlines during the year. Get staff to use e-mail more. (Pioneer)

We needed a regular framework [for meeting] - beginning, middle, and end. We did it when we had to. Difficult to schedule. It would have been better if there were regularly scheduled times for meeting and we could put them on our schedule. We are all taking many courses besides. (Adapter)

My one regret - I really liked the people in my team, and we could have had another team meeting, but it didn't really happen, because it wasn't required. As with a lot of things in life, if it's not required, it won't happen, since it's a lower priority. (Adapter)

Please be clear to all new adapters what is expected of them. Maybe have consequences for adapters who don't follow through. (Adapter)

Teachers' expressed need to more time to meet during the year as a design team, and to have a clear time framework in which to meet were incorporated into the Summer 1999 Teacher Institute. MetroLINC prepared some planning sheets in the participants' folders, and encouraged Pioneers and Adapters to discuss a tentative schedule, and to set up a next meeting date for the group to reconvene.

Several Pioneers also wished that they had been kept more "in the loop", and abreast of meetings that the Adapters were asked to attend, to have been given the option of attending themselves as well, and to receive memos from MetroLINC staff that their Adapters were sent.

A few teachers expressed the view that the MetroLINC project should possibly be more compressed in time, rather than extend a full school year. In that way, teachers could build upon the momentum started during the Summer Institute, and could follow through immediately with their students, and report upon their work earlier in the year, rather than waiting until May. Over the course of a year, teachers felt that some would be inclined to put off their MetroLINC work, and return to it later in the year closer to when deadlines were upon them.

I think that 1/2 a year would have been good length of time to present part of a project. I felt a year was too long and May is a tough time for a showcase....I think a shorter time frame for the adapters to actually display something you've accomplished with your class would be more beneficial. In a year long project you don't move yourself or your students as much as you would for a shorter project...There is something to be said for the momentum you develop in a summer institute or day long sessions. To really keep people motivated there has to be a way to keep the momentum going. (Pioneer)

It was a long time, this project. It dragged out a little. It might have been better if you had "x" number of months to do. It would have forced me to stay on task more. We had done a lot of research a few months back. A couple of months went by before [we got to other parts of the project.] (Adapter.)

I felt kind of out of touch with a lot of things, as far as having to wait. We don't have to present what we've been working on all year until May. We started in the summer and we worked for a week with our Pioneer person, and then we worked for a whole year...I feel that instead of handing it in May we should have handed it in earlier. A lot of people wait until the last minute. Maybe a quarterly thing. There should have been so much time between things. The longer periods to wait doesn't work for everybody. I think they need to narrow it down a little just to keep people on task and doing what they are supposed to be doing. (Adapter)

The main criticism of the project concerned the level and timeliness of communication between MetroLINC staff in Boston and Boston teachers. Teachers felt that there were some scheduling changes for major meetings for which they were notified too late, or

other project requirements that they felt they were not given enough advanced notice, or fully understood. Mailings were sometimes slow, and some participants seemed unaware of efforts to send them notices via e-mail. Others thought the use of a large calendar, or the sending of “gentle reminders of meetings 2 weeks in advance” would be helpful. The current MetroLINC web-site, now that it is fully functioning, will help with many of these communication problems. At the same time, it is important to recognize that some MetroLINC teachers still do not have easy Internet access in their classrooms, may not have a modem at home, and that teachers may regularly log onto their regular e-mail systems used in their school, and only sporadically log onto the MetroLINC web-site.

A second area of concern involved the MetroLINC web-site, which took a number of months (fall and winter) to be up and running more smoothly. Some felt that it was difficult to post their curriculum units on the web-site—a problem that was somewhat due to the lack of a template early in the fall to guide teachers’ writing up of units. Then, in late winter, when the posting of a curriculum unit was required of all Adapters, teachers had to adapt their previously written units into a different format, which was time-consuming for some. This will be much less of a problem this coming year, since current Adapters will have an existing model for curriculum unit write-ups posted by the past round of Adapters.

The Web-site is now up and running much more reliably and smoothly. Also, to the Project’s credit, a number of teachers actively took part of being a member of the teacher design team that advised the MetroLINC web-site’s design last winter. The contributions of the team members were clearly acknowledged by MetroLINC staff at the Summer Institute, and there was a positive sense of ownership, and appreciation for continued feedback and input from all MetroLINC teachers that was extended by staff.

