

**Berkshire Wireless Learning Initiative**

**ABSTRACT 1**

**December 2005- June 2006 “Year 1”  
Evaluation Findings: Student and Teacher Results**

**Prepared for the:**

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## Massachusetts Technology Collaborative

The current document is the first of three annual evaluation abstracts provided to the Massachusetts Technology Collaborative (MTC) by Boston College's Technology and Assessment Study Collaborative (inTASC) evaluation team. MTC provides oversight, on behalf of the Commonwealth, for state funding allocated to the Berkshire Wireless Learning Initiative (BWLI). Annual reports and abstracts of these reports are provided to the BWLI Steering Committee by inTASC at MTC's request in order to better assist the adoption of wireless learning technologies in participating schools. In addition to the current abstract, the full BWLI Year 1 Annual Evaluation Report can be downloaded at <http://www.bc.edu/bwli> and includes a more detailed treatment of the project methodology, response rates, and survey results.

## Preliminary Nature of Current Results

At the time of this report (November 2006), a great deal of progress has been made in the implementation of the BWLI program across the participating Pittsfield (Herberg, Reid, & St. Mark) and North Adams middle schools (Conte). Most notably, after years of planning and preparation, the first class of seventh grade students received and began using their laptop computers in school during the first weeks of January 2006. Teachers across the four schools had already received laptop computers earlier in the year accompanied by training, professional development, and a general increase in their schools' technology resources (LCD projectors, wireless school wide Internet access, etc.). In the current document, we summarize the results of the first year of the laptop initiative, although students had only been provided with laptops for the last five months of the 2005-2006 school year.

This document provides a first look at the data collection from the first "year" of the BWLI evaluation. Specifically, comparisons of BWLI students' and teachers' technology use and attitudes towards technology both before and during 1:1 computing are explored using data collected from the BWLI teachers and students. In addition, student perceptions and experiences have been further examined in the results of the pre/post student drawing exercise and in summaries of the classroom observations.

When examining the results of this first round of data collection, it is particularly important to note that the reported data represents the first five months of the BWLI student implementation. As such, the results present a 1:1 laptop initiative in its very infancy. The tables and graphics presented herein should not be an indication of the overall success or failure of the BWLI goals but rather a snapshot of the current status of the program. It has been postulated in the literature that the full impacts of any educational technology initiative may take many years to be realized. The current report focuses on data gathered within the first five months of a three-year pilot program.

## Evaluation Overview

The BWLI provides a unique opportunity to document the effects of 1:1 computing on teaching and learning using both qualitative and quantitative approaches. Specifically, the evaluation aims to capitalize on the research opportunities inherent in the three-year technology deployment of the BWLI schedule. The evaluation design examines the different grade levels (6-8) through a

series of naturally occurring pre/post comparisons in addition to comparisons at two matched comparison middle schools.

The evaluation aims to provide meaningful data concerning the immediate impacts of the technology on classroom practices. The evaluation design also addresses a number of the more far-reaching goals of the program by examining the impacts of the technology on student achievement and on more nuanced educational impacts using both qualitative and quantitative approaches. Over the course of the three year evaluation, teacher surveys, teacher interviews, student surveys, student drawings, analysis of existing school records, and qualitative classroom observations will be used to document and track the impacts of 1:1 computing on teaching and classroom practices. Student achievement measures will be examined through the secondary analysis of MCAS test data in the three participating public BWLI schools as well as in two comparison middle schools through a non-equivalent comparison group study. An additional student writing assessment is being designed specifically for this project that will allow students to utilize the laptops when composing and editing a short essay.

The final BWLI evaluation results will measure how successfully the program achieves the following targeted outcomes:

1. Enhanced student achievement as shown through *preexisting test scores, grades, teacher survey data and assessments aggregated at the classroom and school levels*;
2. Improved student engagement as shown through *teacher and student survey data, student drawings, attendance data, disciplinary data, and potentially classroom observation*;
3. Fundamental paradigm changes in teaching strategies, curriculum delivery, and classroom management as shown through *teacher and student survey data, student drawings, and potentially classroom observation*; and
4. Enhanced capabilities among students to conduct independent research, and collaborate with peers as shown through *teacher and student survey data, student drawings, and potentially classroom observations*

Table 1, below, describes each of the BWLI data collection procedures linked to the targeted project outcomes that they address.

Table 1: BWLI Data collection procedures and targeted project outcomes

<b>Procedure</b>	<b>Description</b>	<b>Outcome(s)</b>
Student Survey	Web-based student surveys will be given to every BWLI student before they experience 1:1 computing (Pre) and again near the end of each 1:1 school year (Post)*.	1, 2, 3, 4
Teacher Survey	Web-based teacher surveys will be given to every BWLI teacher before their students experience 1:1 computing (Pre) and again near the end of each 1:1 school year (Post)*.	1, 2, 3, 4
Student Drawing	A student drawing exercise will ask BWLI students to reflect on “writing in school” through an open ended drawing exercise before they experience 1:1 computing (Pre) and again near the end of each 1:1 school year (Post).	2, 3, 4
Classroom Observation	Trained undergraduate and graduate MCLA students will conduct pre-arranged visits to observe and record technology practices in pre-selected 1:1 classrooms.	2, 3, 4

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MCAS Analysis	BC researchers will access item-level MCAS results for each 1:1 BWLI student to determine the impacts of various technology practices (as measured in the student and teacher surveys) on standardized test performance*.	1
Writing Assessment	1:1 BWLI students will participate in a short computer-based writing assessment to determine the impacts of technology practices (as measured in the student and teacher survey) on writing length and quality*.	1
Teacher Interviews	At various intervals across the deployment of 1:1 student laptops, BWLI teachers may participate in short informal interviews regarding their progress and attitudes towards the program.	2, 3, 4
Principal Interviews	At various intervals across the deployment of 1:1 student laptops, BWLI principals may participate in short informal interviews regarding their progress and attitudes towards the program.	1, 2, 3, 4
Use of Existing Data	We will meet with each school to determine what data already collected by the school or district could be analyzed to show impacts of 1:1 computing. Specifically, we will seek attendance/tardiness data, disciplinary records (detentions, referrals, etc.) and student grades.	1, 2, 3

*\* Indicates that comparison group (i.e. non 1:1) students/teachers are also participating*

## Methodology and Responses Rates

### *Teacher Survey*

As more fully described in the BWLI Evaluation Plan and past Quarterly Reports, every teacher participating in the BWLI program was to be surveyed prior to and during 1:1 student computing. To this end, seventh grade teachers across the four BWLI schools (as well as the two comparison group schools) were asked to complete pre-1:1 laptop surveys in January 2006 and post- 1:1 laptop surveys in May/June 2006.

The teacher survey included item sets dedicated to capturing the variety and extent of teachers’ technology use, teachers’ attitude toward technology, teaching, and learning, as well as teachers’ beliefs on student motivation and engagement. Additionally, survey items relating to technology use in the classroom were developed in relation to the current Massachusetts Curriculum Frameworks for the primary subject areas (English/Language Arts, Science, Social Studies, and Math). In the survey, teachers were asked a series of closed and open-ended questions to reflect and share how technology has been integrated into the specific curriculum strands of the state frameworks for their specific subject area. The teacher survey also included a section that focused on the professional development they have received in conjunction with the laptops, the extent to which they have applied what they learned, and additional support that they may feel they require. Similarly, a section of the survey focused on technical aspects of the program (e.g., slow network, difficulty accessing on-line materials, timeliness of technical support, etc.) that may be impeding the full effects/benefits of the initiative.

It is challenging to simply report the response rates of the teacher survey as schools self-selected which staff members would take the survey. The guidelines provided by the evaluation team suggested that any teacher “who works with any 7<sup>th</sup> grade student that will receive a laptop during the 05/06 school year” should complete the 7<sup>th</sup> grade teacher survey. This intentionally sought to

include all 7<sup>th</sup> grade classroom teachers, “specials” teachers including art, music and physical education, as well as special education and guidance teachers in some cases. However, this eligibility requirement was too vague and different schools interpreted the directive differently. This incongruity creates a challenge in determining the exact teacher survey response rates for Year 1, so only estimated response rates are reported for the Year 1 results. Table 2 shows the number of 7<sup>th</sup> grade teacher survey responses for both the pre (1/05) and post (6/06) teacher survey administrations.

Table 2: 7<sup>th</sup> grade teacher survey respondents

School Name	7 <sup>th</sup> Grade Teacher Completed (1/06)	7 <sup>th</sup> Grade Teacher Completed (5/06)
Conte Middle School	16	9
Herberg Middle School	10	20
Reid Middle School	0	21
St. Marks/St. Joe	3	3
<b>Total BWLI:</b>	<b>29</b>	<b>53</b>

As Table 2 shows, 29 7<sup>th</sup> grade teachers completed the January 2006 teacher survey while 53 completed the May/June 06 survey. It is estimated there were approximately 58 eligible 7<sup>th</sup> grade teachers across the four BWLI schools. Thus, the estimated teacher survey response rate was approximately 50% for the pre-1:1 survey and approximately 91% for the post-1:1 survey.

The post-1:1 response rate allows one to place more confidence in the results being representative than the pre-1:1 response rate, thus indicating that the data presented for the 7<sup>th</sup> grade teachers post 1:1 results are likely to be a close representation of all BWLI 7<sup>th</sup> grade teachers.

Student Surveys

As previously outlined in the BWLI evaluation plan, every participating seventh grade student in the BWLI program was to be surveyed prior to and approximately five months after receiving a laptop. The online student survey emphasized the frequency of a variety of technology uses both in and out of the classroom as well as across the curriculum. Students were additionally asked to report on the frequency of their teachers’ use of technology across major curricular areas (Math, Reading/ELA, Social Studies, and Science) in addition to a handful of demographic items and a brief attitudes and beliefs inventory. In every case, survey items were created or adapted specifically for the current study and were extensively examined by the evaluation team.

Seventh grade students across the four BWLI schools completed pre-1:1 laptop surveys in December 2005 and early January 2006. Table 3, below, shows the seventh grade student survey response rates for the pre-laptop survey for each participating school.

Table 3: Seventh grade pre-laptop student survey response rate (1/06)

School	# of 7 <sup>th</sup> Grade Students	Survey Responses	Response Rate
Conte Middle School	127	121	95.3%
Herberg Middle School	257	208	80.9%
Reid Middle School	218	184	84.4%
St. Mark’s	61	61	100.0%
<b>Total BWLI:</b>	<b>663</b>	<b>574</b>	<b>86.6%</b>

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Response rates were generally good for this first round of web-based surveys considering the lack of technology available within the schools at the time of surveying (pre-1:1 laptops). Across the four BWLI schools, the overall response rate from the student survey was 574 surveys, or 86.6% of the estimated 663 seventh grade student population.

Table 4, below, shows the seventh grade student survey response rates for the post-laptop survey for each participating school.

Table 4: Seventh grade post-laptop student survey response rate (6/06)

School	# of 7 <sup>th</sup> Grade Students	Survey Responses	Response Rate
Conte Middle School	127	95	74.8%
Herberg Middle School	257	212	82.5%
Reid Middle School	218	161	73.9%
St. Mark's/St. Joe's	61	59	96.7%
<b>Total BWLI:</b>	<b>663</b>	<b>527</b>	<b>79.5%</b>

Seventh grade students across the four BWLI schools completed post-1:1 laptop surveys in late May and early June 2006 after approximately five months of 1:1 computing. Across the four BWLI schools, the overall response rate from the student survey was 527 surveys, or 79.5% of the estimated seventh grade student population of 663 students.

Student Drawings

For the first year of the BWLI program, all seventh grade students in the BWLI schools were also asked to participate in a pre/post drawing exercise. In each school, teachers distributed blank drawing forms to their students that asked them to "...Draw a picture of yourself writing in school". Seventh grade BWLI students completed a pre-laptop student drawing exercise during the last weeks of December 2005 just before the student laptops arrived. After approximately five months of 1:1 computing (late May/early June 2006), seventh grade students were again asked to participate in the drawing exercise.

When seventh grade students across the four BWLI schools completed the drawing exercise in December 2005, response rates were generally good across each of the four schools with a total of 577 student drawings collected, or 87.0% of the estimated seventh grade student population of 663 students. Table 5, below, shows the seventh grade student survey drawing response rates for the pre-laptop drawing across the BWLI schools.

Table 5: 7<sup>th</sup> grade pre-laptop student drawing response rate (12/05)

School	# of 7 <sup>th</sup> Grade Students	Drawing Responses (Pre-Laptop; 12/05)	Response Rate (Pre-Laptop; 12/05)
Conte Middle School	127	123	96.9%
Herberg Middle School	257	219	85.2%
Reid Middle School	218	174	79.8%
St. Mark's/St. Joe's	61	61	100%
<b>Total BWLI:</b>	<b>663</b>	<b>577</b>	<b>87.0%</b>

After five months of 1:1 computing, seventh grade students across the four BWLI schools were again asked to participate in the drawing exercise in May/June 2006. Response rates were again generally good for this activity with a total of 554 student drawings collected, or 83.6% of the estimated seventh grade student population of 663 students. Table 6, below, shows the seventh grade student Reid drawing response rates for the post-laptop drawing across the BWLI schools.

Table 6: 7<sup>th</sup> grade post-laptop student drawing response rate (6/06)

School	# of 7 <sup>th</sup> Grade Students	Drawing Responses (Post-Laptop; 6/06)	Response Rate (Post-Laptop; 6/06)
Conte Middle School	127	119	93.7%
Herberg Middle School	257	213	82.9%
Reid Middle School	218	161	73.9%
St. Mark's/St. Joe's	61	61	100%
<b>Total BWLI:</b>	<b>663</b>	<b>554</b>	<b>83.6%</b>

In January 2006 and again in July 2006, Damian Bebell conducted training sessions for coding the student drawings with Boston College work-study students.. For each student drawing, a trained researcher codes a number of dichotomous features that have been pre-selected using an emergent analytic coding process established through prior 1:1 research studies (Russell, Bebell & Higgins, 2004; Russell, Bebell, Cowan & Corbelli, 2003). The specific features coded in the drawings fall into four broad categories: Student Characteristics (what the students were doing), Technology Present (type of technology depicted), Student Demeanor (whether the student was depicted positively, negatively, or neutral), and Other Features (presence of teacher or other students, classroom decorations, multi-frame drawing).

Classroom Observations

In the first six months of the BWLI evaluation, classroom observations were used as one of many tools to help develop an understanding of the varied ways in which technology was being used throughout the school day. The data provided from the classroom observations serves two chief purposes in the overall evaluation of the 1:1 initiative. First, the classroom observers record and document the variety and types of specific technology uses they witness in visiting a variety of different 1:1 classrooms. Secondly, through these observation records the evaluation team seeks to develop a better sense of the current technology practices occurring within the schools.

As described in the BWLI Evaluation plan, the evaluation team has established a collaborative relationship with administrators and faculty from the Massachusetts College of Liberal Arts (MCLA) to utilize MCLA students to conduct classroom observations. Two trained and National Institute of Health certified MCLA students served as classroom observers at the Conte school during the spring semester, both receiving a small stipend and university credit for their participation. Throughout the observations, both students worked collaboratively with Damian Bebell and school leaders to schedule the visits that involve active uses of technology. In each case, we solicited volunteer teachers who would be using technology for potential classroom observations. Since the classroom observations were chiefly concerned with documenting broad technology practices, the described approach seemed feasible from both the perspective of the classroom teachers and the evaluation team. Given this, the classroom observations collected during Spring 2006 should not be viewed not as a representative sample of 1:1 classrooms, but rather volunteer teachers who offered to share a technology-rich lesson with an observer.

During Spring 2006, a total of 11 classroom observations were conducted by the evaluation team. All of the formal classroom observations occurred at the Conte Middle School in North Adams due in large part to its geographic proximity to the MCLA campus. Given that some teachers

volunteered more frequently to be observed, the resulting observations do not occur with equal frequency across subject areas with majority of the observations occurring during math (n=6) and English/Language Arts (n=3) classes. In addition, one Spanish and one Social Studies class were observed.

## Major Findings From the First Five Months Of Data Collection

As previously stated, the results presented below represent the first five months of 1:1 student computing across four Berkshire middle schools participating in a three-year technology-rich initiative. Examining the results across the teacher surveys, student surveys, student drawings, and classroom observations collected during the first five months of students' 1:1 laptop experience a number of trends emerged from the data. Each of these trends are presented below followed by a brief summary of the data that supports each of the findings. In many cases, additional supporting evidence for these results was confirmed through formal and informal interviews with project personnel, school principals, and selected teacher participants.

### ***BWLI teachers and students reported large increases in their use of technology in the classroom.***

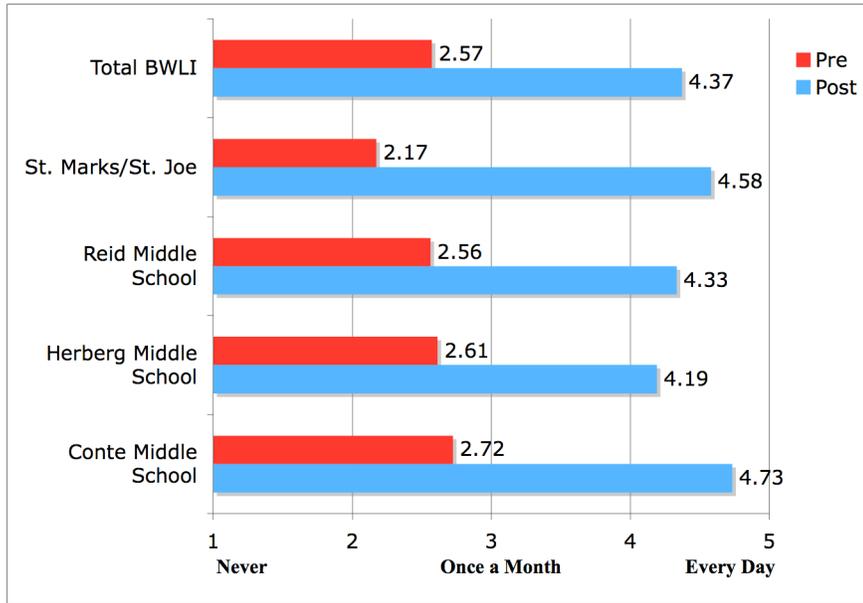
Based upon the student and teacher survey results, the transition to 1:1 student computing appears to be associated with a widespread increase in teachers' and students' use of computers. Within the first five months of the 1:1 implementation, the number of teachers who never "used instructional technology with students..." dropped from 38% to 6% of responding teachers as Table 7 illustrates:

Table 7: Frequency of instructional technology use with students (Teacher Survey)

	<b>Pre-1:1 %</b>	<b>Post-1:1 %</b>
Never	38%	6%
Once a month	17%	13%
Once a week	28%	30%
Every Day	7%	45%

Across each of the four schools students similarly reported significant increases in their use of technology in the classroom, as Figure 1 illustrates:

Figure 1: Frequency of pre/post technology use in the classroom (Student Survey)



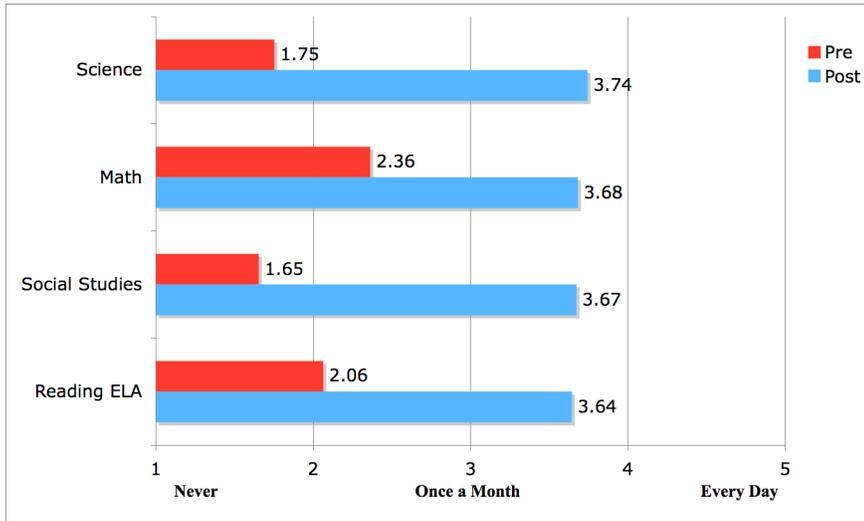
1=Never 2=Every Couple of Months 3=Once a Month 4= Once a week 5= Every Day

This increase in technology use as demonstrated by both the student and teacher data suggests that within five months of student computing, the existing educational practices were changing across each school as technology use became significantly more widespread. Three of the four schools also witnessed a small decrease in students’ technology use in computer labs and at the school library. Taken together, these findings suggest that in addition to technology use increasing at each school, the majority of schools witnessed a shift from using technology in “shared” non-classroom settings to more sustained regular use within the classroom.

***BWLI students and teachers reported increases in technology use across the curriculum and across the four middle schools.***

In addition to the increases in technology reported at each school, students and teachers also reported that technology use was occurring more frequently in each of the primary subject areas. This result is demonstrated by the student survey results summarized in Figure 2:

Figure 2: Frequency of pre/post technology use across the core curriculum (Student Survey)



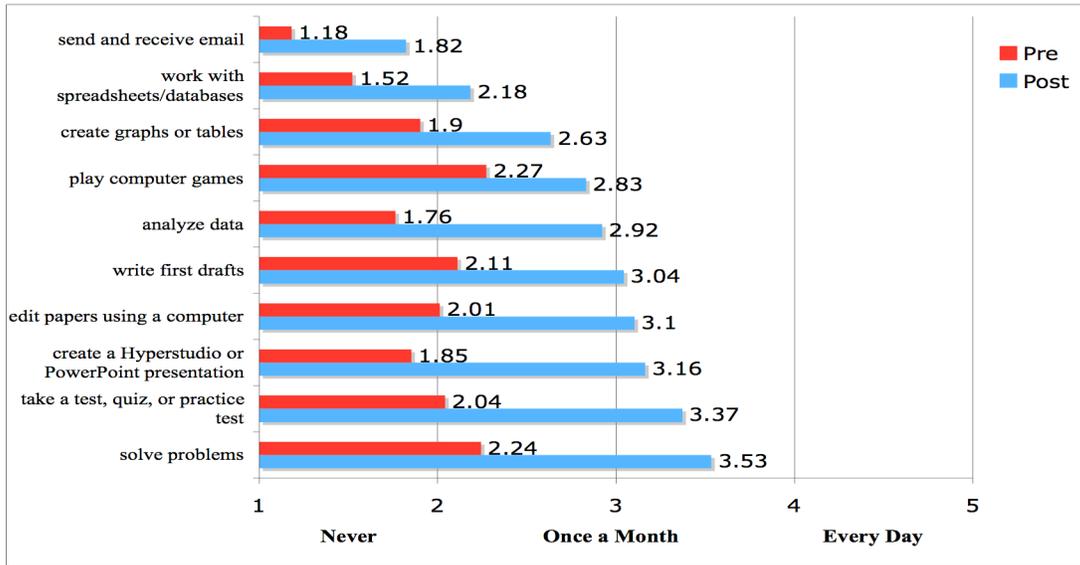
1=Never 2=Every Couple of Months 3=Once a Month 4= Once a week 5= Every Day

Across the BWLI schools, students reported substantial average increases in their use of technology for Science, Math, Social Studies, and English/Language Arts classes. These findings are observed across each of the BWLI schools, suggesting that the increases in teachers and students use of technology was occurring throughout the curriculum at each of the participating schools rather than in a specific subject area.

***BWLI students reported increases across a wide variety of in-school technology uses.***

BWLI students reported a wide variety of educational technology uses were occurring in school within the first five months of the programs implementation. In fact, each type of specific technology use measured by the pre/post student surveys increased significantly after five months of 1:1 computing as illustrated in Figure 3:

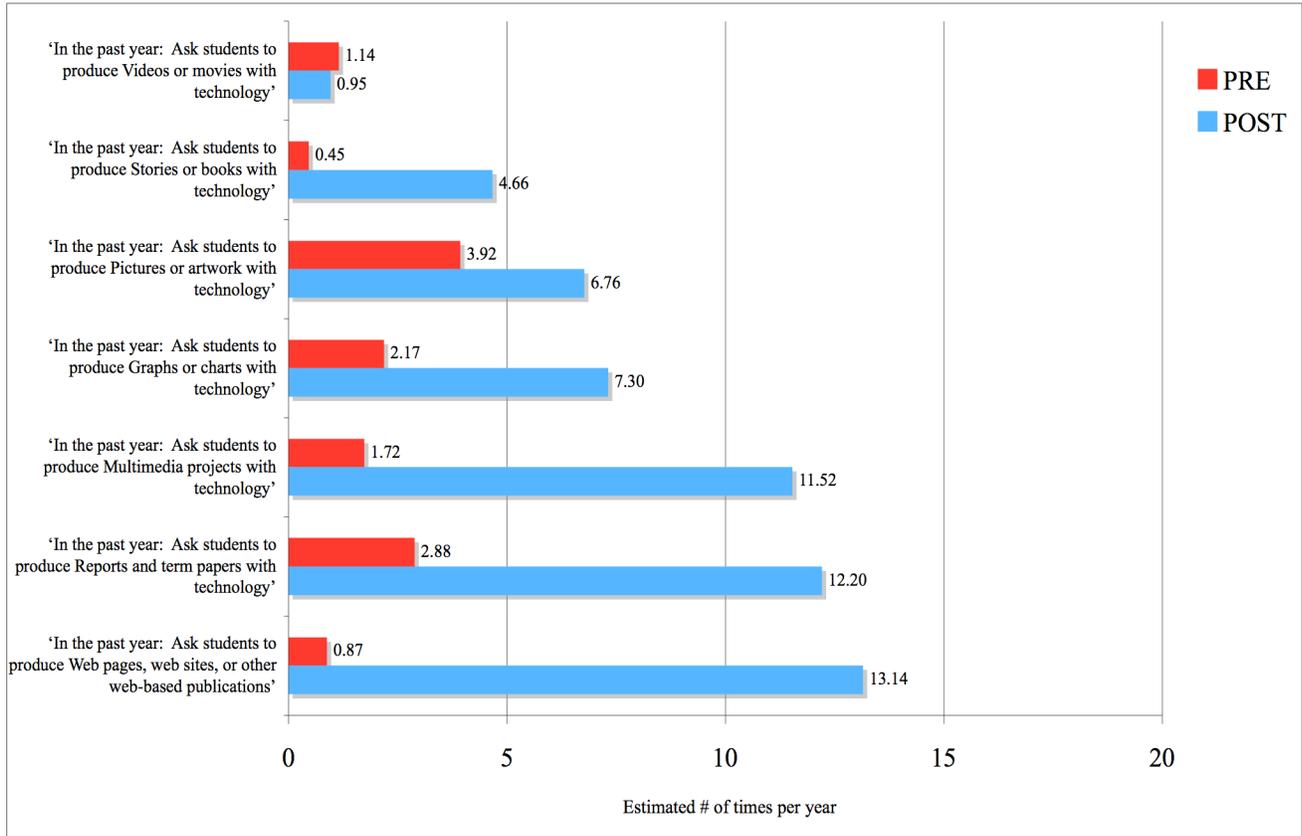
Figure 3: Frequency of Specific Student Technology Uses in School (Student Survey)



1=Never 2=Every Couple of Months 3=Once a Month 4= Once a week 5= Every Day

Two of the largest increases reported by the students were using a computer to “solve problems” and “taking a test, quiz or practice test” both of which occurred between “once a month” and “weekly” in the post-1:1 survey. Other substantial increases were observed for “creating a Hyperstudio or PowerPoint presentation” and “analyzing data”. Also, students reported increased use of computers to work with spreadsheets, databases, analyze data, and create graphs and tables, triangulating the previously discussed results showing increased technology use in Mathematics. Similarly, recorded increases in students reported use of technology to write and edit papers may correlate with the overall increase of technology use in previously described Reading/ELA findings. As similarly reported by the students during this period, teachers report a large increase in the number of technology-embedded assignments that they assign to their students after the arrival of 1:1 student computing as illustrated by Figure 4:

Figure 4: Frequency of teachers' assigning students technology related products (Teacher Survey)

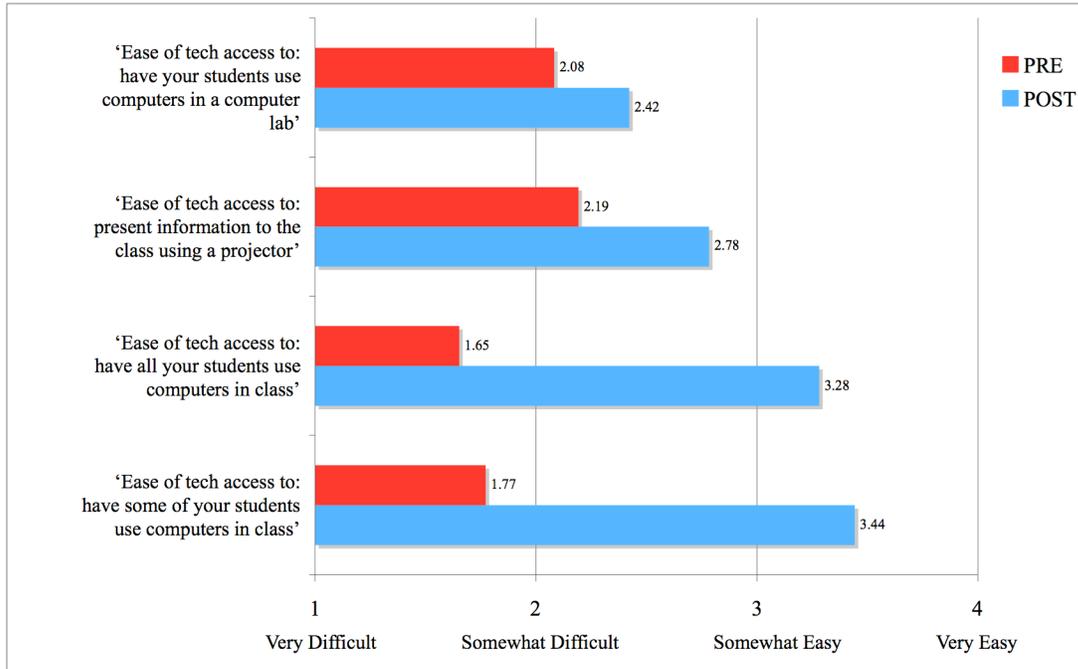


Of the surveyed technology applications, teachers in the post-1:1 laptop survey reported that asking students to produce “web pages, web sites, or other web-based publications” and “reports and term papers” were the most frequent, occurring on average over 12 times per teacher per school year. This represents a substantial shift in practice from the January 2006 survey where “reports and term papers” were assigned just under three times per year while “web pages, web sites, or other web-based publications” were assigned less than once per year, on average. A similar increase in practices was reported for the average frequency with which teachers assign their students to “produce multimedia projects using technology,” which averaged under two times per year in the pre-1:1 laptop surveys and nearly 12 times per year in the post-1:1 surveys.

***BWLI teachers reported a substantial increase in their abilities to access technology resources.***

One of the most striking initial results in the adoption of a 1:1 technology program is the sudden increase in technology resources available to students and teachers (Bebell, 2005; Russell, Bebell & Higgins, 2004). Based on the teacher results, it is clear that access to technology increased substantially for the majority of BWLI teacher respondents in the five months between the two survey administrations. This is evidenced by the actual increase in the number of technology products available within teachers' schools and classrooms as well as from increases in their reported “ease of access” to the common educational technology scenarios as illustrated in Figure 5:

Figure 5: Teachers’ ease of technology access (Teacher Survey)



After five months of 1:1 computing, teachers reported the largest relative improvement for scenarios having some or all of their students use computers in class. Despite the increases in the average teacher’s access to technology as reported above, inequities in teacher resources both across and between the BWLI schools remained present at the time of the May/June teacher survey. For example, teacher interviews and classroom observations during the first months of student 1:1 computing found that LCD projectors were not universally available in classrooms as originally outlined in the technology deployment plan. At the time of the January survey, 46% of the responding BWLI teachers reported that they had an LCD projector available to them in their classroom. In June 2006, 51.6% responded that they had an LCD projector in their classroom suggesting that as of June 2006, inequities continue to exist in teachers’ access to technology tools.

***BWLI teachers reported large increases in the ways and frequency with which they use technology.***

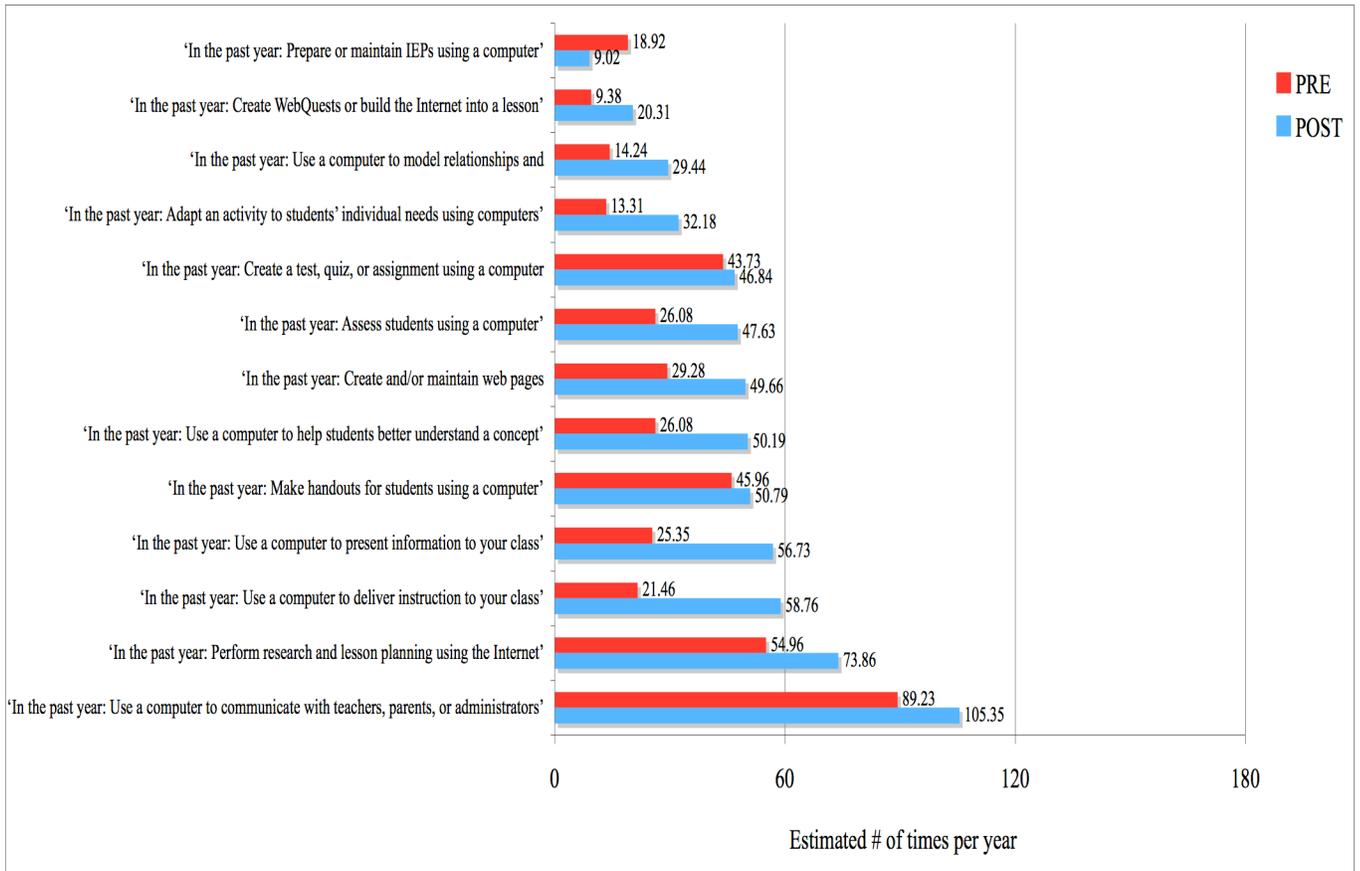
Based on the teacher results, it is clear that the frequency and variety of technology use increased substantially for the majority of BWLI teacher respondents in the five months between the two survey administrations. Teachers’ use of technology stretched beyond the immediate classroom setting and teachers reported increases across a wide variety of technology uses including “using technology for professional activities such as lesson planning, administrative tasks, communications, and collaborations” as reported in Table 8:

Table 8: Teacher reported frequency of professional technology use (Teacher Survey)

	Pre-1:1 %	Post-1:1 %
Never	17%	2%
Once a month	10%	6%
Once a week	17%	11%
Every Day	45%	76%

Other uses of technology by teachers typically saw increases during the first school year of the BWLI program as illustrated in Figure 6:

Figure 6: Teachers’ pre and post frequency of technology use (Teacher Survey)



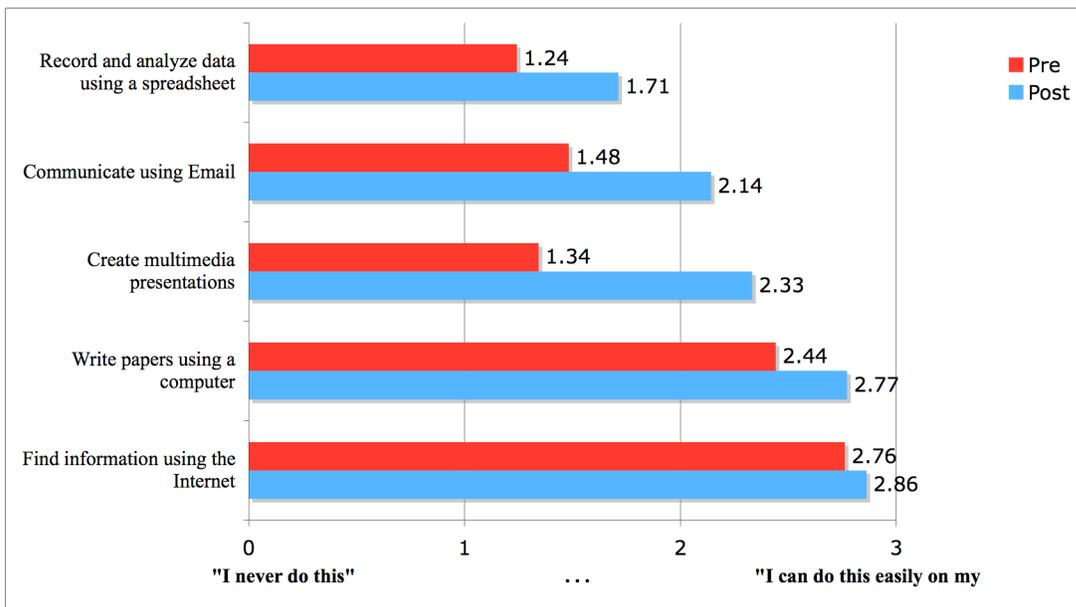
In both the pre and post measures, BWLI teachers report that the most frequent of the surveyed technology use was “using a computer to communicate with teachers, parent, or administrators”. Specifically, after five months of 1:1 computing, the average BWLI teacher reports using email over 100 times in the course of the school year with many teachers reporting daily use of email for professional purposes. This is an increase in average email use reported in the January 2006 survey where professional use of email averaged 89 emails per school year. Teachers also reported “performing research and lesson planning using the Internet” as the second most frequently occurring average technology use listed in the survey with 55 and 74 respective instances of use before and after student 1:1 computing. Other substantial increases were observed for the use of technology within the classroom for instruction. For example, teachers reported on average that they used a computer to “deliver instruction to class” an average of 59 times after about five months of 1:1 student computing compared to an average of 21 times per

year before 1:1 computing. Similarly, teachers also reported that they used a computer to “present information to their class” 57 times, on average, after five months of 1:1 computing compared to an average of 25 times per year before 1:1 student computing. “Adapting an activity to students’ needs using a computer” increased from 13 times per year on average to 32 times per year within six months of 1:1 computing. These results suggest a notable shift in how teachers approach their work both behind the scenes (email use, lesson planning) and while delivering instruction to their class. Taken collectively, it appears that the majority of the BWLI respondents are using technology for a wide variety of professional tasks, which have markedly increased since the adoption of 1:1 student computing.

***BWLI students reported an increase in their ability to use technology after five months of 1:1 computing.***

Students and teachers both report improvements in students’ technology skills and abilities, particularly for “creating multimedia presentations”, “communicating via email”, and “recording and analyzing data using a spread sheet”. In general, students reported the most comfort using computers to find information on the Internet and write papers. The majority of students reported that they could perform such tasks “easily on my own” or “sometimes needing help” as illustrated by Figure 7:

Figure 7: Students’ reported skills across a variety of technology uses (Student Survey)



0=	1=	2=	3=
I never do this	I can do this, but often need help	I can do this, but sometimes need help	I can do this easily on my own

***BWLI students reported access and frequent use of technology at home.***

On average, most BWLI students reported fairly robust access to computers at home with an average of 1.7 computers reported at their home during the January 2005 survey administration

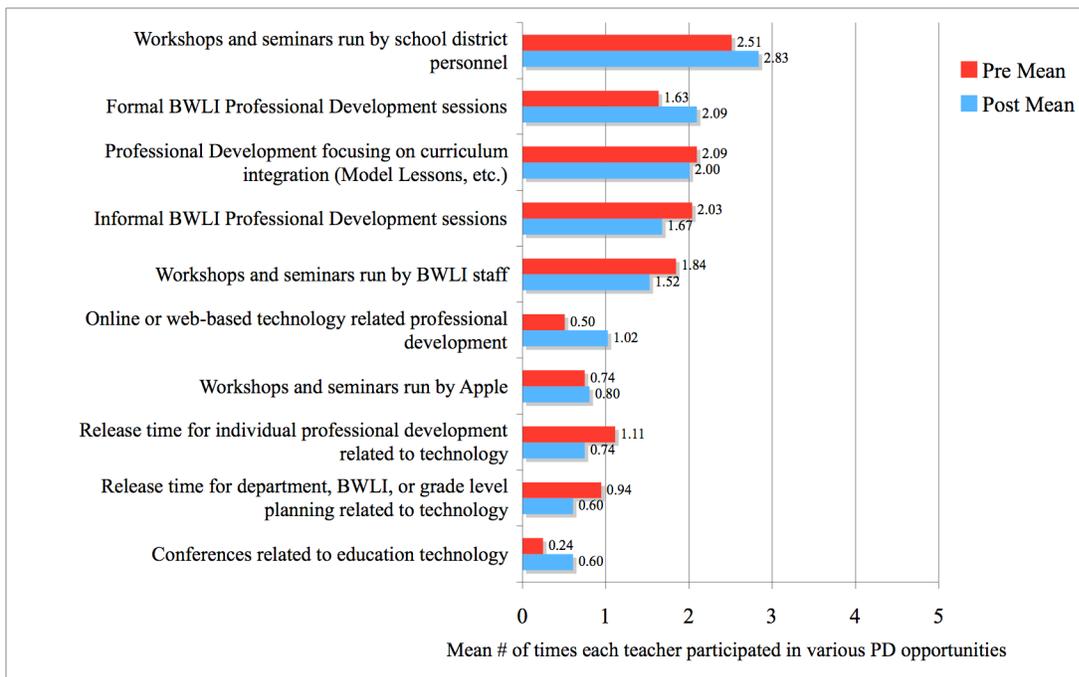
and 2.2 computers at home during the May 2005 survey. However, differences in home access to technology were observed in both survey administrations across the four middle schools.

Across both the pre and post surveys, students reported that they used their home computer more than one hour per school day, on average. The average number of minutes BWLI seventh graders' report using their home computer on a typical non-school day (weekend, vacation, etc.) was over 70 minute per day in both the pre and post survey administrations.

***BWLI teachers reported frequent participation and overall satisfaction with BWLI professional development offerings.***

A common issue with 1:1 computing initiatives is the failure to realize the large role (in terms of both budgeting/financing and educational philosophy) played by professional development. Teachers across the BWLI schools were provided a variety of potential professional development opportunities ranging from formal seminars run by Apple to informal technology integration workshops and meetings. As part of the overall BWLI evaluation, the evaluation team sought to document some of these experiences and provide formative feedback from the teacher participants on what offerings were most popular and valuable to the BWLI 7<sup>th</sup> grade teachers. Figure 8 shows teachers' self-reported frequency of participation in a variety of formal and informal "professional development" experiences:

Figure 8: Teachers' participation in various BWLI related professional development opportunities (Teacher Survey)



The survey results indicate that 7<sup>th</sup> grade teachers were actively involved in BWLI activities before the students received their laptops and continued to participate in professional development throughout the first five months of the student deployment of laptops. The data also suggest that the majority of BWLI teachers have participated in a wide variety of professional

development experiences throughout the first year of the BWLI implementation. Lastly, additional survey data suggests that the majority of BWLI 7<sup>th</sup> grade teachers reported to be largely satisfied with the professional development offerings.

## Summary/Conclusion

The data summarized in the current report focuses on the most immediate effects of the first six months of a 1:1 computing initiative across four middle schools. As previously stated, the data presented herein concerns a laptop initiative in its early stages of implementation. As such, the data should be viewed as an early snapshot of the program implementation rather than a conclusive summative report.

When viewing these tables and figures it is important for the reader to remember that the current paper presents only the perspectives of those 7<sup>th</sup> grade teachers and students who participated in the BWLI program. Future examinations will include more “objective” measures of program success including the analysis of school records and standardized test scores as well as the comparison to student and teachers in a control group setting.

The student data presented in the current paper does provide a good indication of the early implementation of the BWLI program. Both the student survey data and the student drawings suggest that the majority of students and teachers appear to have quickly assimilated their new technology into the curriculum. Specifically, students and teachers report increases in technology use across the curriculum at nearly all BWLI sites within the first six months of the program. Students also report the increase of a wide variety of technology uses within the course of a school day and report a high degree of confidence and skill with technology. Although not reported in the current report for the sake of brevity, nearly all of the major pre/post technology use increases reported from the student survey data have tested “statistically significant” using the most common statistical parameters ( $p < .05$ ). Such increases in such a relatively short period of time are undoubtedly the hard work of many individuals and should not be overlooked or understated. However, both the drawing and survey data suggest that there is ample opportunity for further increases in computer applications across the curriculum. For example, the average BWLI seventh grade student reports that even after six months of 1:1 computing they typically use technology less than once per week for most of their core curriculum classes. Following these students in the future will provide further data and a richer understanding of the short and long term effects on 1:1 computing.

A similar story seems to emerge from the teacher data. Although teachers have participated more actively in the BLWI program longer than their students have had laptops, the large influx of technology in early January resulted in a marked shift in the way the majority of teachers prepared and presented their curriculum. For example, within about five months of 1:1 student computing, 76% of responding BWLI teachers report that they are using technology “everyday” for “lesson planning, administrative tasks, communications, and collaborations” compared to only 45% six months prior. Similarly, in the January 2006 survey only 35% of BWLI teachers reported to be using instructional technology with their students at least once per week compared to 75% six months later. However, nearly 20% of responding BWLI teachers still report in the June 2006 survey that they use instructional technology with their students once a month or less indicating that not every BWLI teacher has substantially altered their practices (in the January 2006 survey, 55% of teachers reported they use instructional technology once a month or less). Looking across the various surveyed technology uses, it appears that the majority of BWLI

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teachers have made major changes in how they construct their lessons, communicate with other professionals, and present content to their students. There also appears to be a major increase in degree to which technology was used by the 7<sup>th</sup> grade students to complete their work and assignments both in the classroom and at home. This integration of instructional technology throughout the teachers' workday was reflected by both the pre and post student and teacher findings. In summary, technology use has increased substantially across the curriculum in most BWLI settings for the large majority of teachers and students. This represents a fairly large shift in existing practice.

In addition to the increases in technology use, after five months of 1:1 student computing, teachers appear to have, by and large, embraced the philosophy and underlying beliefs of the laptop initiative's goals and aims. The majority of the BWLI respondents also reports quite positive attitudes and beliefs towards technology in both pre and post survey administrations. Furthermore, teachers report actively participating in a wide variety of BWLI related professional development opportunities and appear largely satisfied with those offerings.

Current and future copies of all BWLI Annual Evaluation Reports will be made available at <http://www.bc.edu/bwli>.