Report

State-wide Evaluation of the New Hampshire ESEA Title II, Part D Grant Program

Final Report

New Hampshire Department of Education

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EXECUTIVE SUMMARY

The Title II-D grant program, "Enhancing Education Through Technology," (EETT) provides financial assistance to higher poverty school districts that have the greatest need for technology support or have been identified as being in need of improvement. In 2009, the American Reinvestment and Recovery Act (ARRA) provided an additional $650 million in Title II-D funding to schools. With the ARRA Ed Tech funds, state educational agencies had the opportunity to implement 21st century classrooms in their schools with the goals of enhancing instruction, facilitating teaching and learning, and improving student achievement. Through both EETT regular and ARRA grant funds, the New Hampshire Department of Education (NHDOE) funded three technology-focused projects beginning in Fall 2009: (a) ARRA 21st Century Classrooms, (b) Classroom Technology Mini-Grants, and (c) the Tech Leader Cohort (TLC) Program.

ARRA 21st Century Classrooms
ARRA Ed Tech grant funds were given to 19 districts across the state to purchase and implement new technologies to create 21st century K-12 classrooms.

Classroom Technology Mini-Grants
The NHDOE also used EETT regular grant funds to fund "exemplary projects" in 35 districts that used technology in core content areas and could easily be shared and replicated. Each grant recipient received $10,000, with at least $2,500 being used for professional development.

Tech Leader Cohort (TLC) Program
Using regular EETT funds, NHDOE provided funding to four lead districts in the state to offer high-quality professional development to school administrators and teachers. A total of 47 school teams, consisting of two teacher leaders and one supporting principal per school, explored resources and approaches for creating 21st century learning environments that combined face-to-face learning with online learning. Each of the four districts coordinated and hosted TLC activities to ensure a common experience for participants.

Federal guidelines for the EETT grant program required that districts have a means of evaluating the extent to which grant activities are effective in (1) integrating technology into curricula and instruction; (2) increasing the ability of teachers to teach; and (3) enabling students to meet challenging state standards. To this end, the NHDOE worked with a consortium of district grantees to select Hezel Associates, LLC to conduct a statewide evaluation of their Title II-D grant program. The evaluation intends to provide a statewide common perspective on how grant recipients are using technology to implement 21st Century Classrooms and how these environments are affecting teacher instruction and student learning.

Hezel Associates' statewide evaluation of New Hampshire's ESEA Title II, Part D grant program is founded on a mixed-methods approach to answer its research questions. Hezel Associates developed its own instrumentation for the evaluation and also used instrumentation that was previously developed by NHDOE. Instruments used for the evaluation generated both qualitative and quantitative data, which allowed for greater depth and breadth of analysis.

In this report, evaluation focused on the program effectiveness, transparency, accountability, and equity of Title II-D grant program activities. Five research questions were developed by Hezel Associates to further refine the focus of the evaluation. These five research questions are presented below with the conclusions.

ARRA 21st Century Classrooms Grant

1. How well are school staff members turning classrooms into technology-rich learning environments, fully equipped with hardware, software, and rich digital resources for learning?
Across the ARRA grant program, educators employed a variety of emerging technologies. As a result, they expanded their instructional approaches to include more constructivist and student-centered activities, such as writing/creating, researching and collaborating. The increase in these applications is likely an effect of the teachers' increased comfort with technology, as the percentage of teachers who generally feel comfortable using the resources in their classrooms jumped from 75.4 percent prior to the grant to 98.4 percent by the end of the initiative.

With the increased availability of technology, it is not surprising that teachers reported substantial increases in student use of technologies for learning purposes and activities. However, student data showed more modest changes, with the use of desktop computers, netbooks, and digital projectors the only technologies for which there were significantly larger increases in use when compared to the control group.

Districts utilized various support personnel and solutions to address initial and ongoing maintenance needs. However, they reported that they could use more readily available personnel for curricular integration. In addition to delays in deployment, other challenges to properly equipping educators' learning environments included residual connectivity and compatibility issues; varying degrees of experience and comfort with technology at the start of the grant; and lack of time for professional development and to learn, plan, and share around the resources.

Despite these challenges, educators had positive outlooks on the potential for using technology to improve student learning and instructional effectiveness. Teachers reported increasingly positive perceptions regarding the time it takes to plan lessons that use technology, though more than half still had reservations at the end of the grant period about the time it takes to plan instruction around the technology. Teachers collaborated and shared ideas with their colleagues more often as the grant progressed and they widely believed that their administrators are interested in their use of the resources with students.

2. To what degree are these settings encouraging mediating outcomes for students including interactive learning, higher-level thinking skills, and student engagement?
Educators reported increased student engagement, motivation, and concentration as a result of the ARRA grant. While changes in student perceptions were not as notable, many students reported being more interested in schoolwork when using technology than when using other resources. Also, administrators and teachers reported that technology readily contributed to student learning and skill-building, including higher-order thinking and real-world skills; however, only a few sites were able to articulate tangible gains in student achievement.

Teachers also reported that the technology contributed to their own skills as educators to address various areas of student learning, particularly among different types of learners. However, while teachers increased their use of several types of technology applications, a noteworthy number of teachers devoted resources to more solitary instructional activities (i.e., worksheets, assessments, practice/drills). Walkthrough observation data confirmed that students' cognitive levels were most often *understanding* and *application*, with small increases in more advanced cognitive levels in student learning. Nevertheless, schools reported that students were largely meeting various ICT competencies that address higher-order applications of the resources (e.g., creativity, collaboration, critical thinking).

As several administrators and teachers discussed delays of equipment, technical difficulties, and the need for additional time to learn the technologies, effects on students may be more prevalent in the 2011-12 school year. Because of the potential barriers identified and the short project timelines, several sites indicated plans for reviewing student data (e.g., standardized test scores) in future years to track progress and impact.

3. To what degree does the provision of technology tools translate into real opportunities for students to collaborate and connect with new content?
Classroom opportunities for student collaboration around the technology resources (e.g., small groups, pairs) increased notably among grant teachers' self-reported activities. The frequency of technology activities that engaged students in collaborative applications increased by half over the course of the year, and other individual and whole-class/teacher-led applications of technology were also reported as occurring regularly.

Educators provided anecdotal evidence of students utilizing technology-enabled collaborative modalities and real-world connections to connect with new content. The technology enabled students to learn from each other, students in other countries, and current/relevant information from around the globe to "bring the outside world in" and add a dynamic element to their learning experiences.

4. How are new technologies and resources serving students of various groups, including those with the highest need?
Early accessibility of grant resources among schools in need of improvement (SINI) appeared sufficient and comparable to non-SINI sites, and SINI schools often received the technology even earlier than non-SINI buildings.

Nevertheless, non-SINI students generally had greater access to – and more frequent use of – several resources, including hardware devices (e.g., laptops, digital cameras) and software applications (e.g., creating multimedia files, creating/editing word processing documents, using Excel to record data). However, while students at non-SINI schools concluded the grant period with generally higher technology proficiencies in several areas (perhaps as a result of greater access to hardware/software solutions), SINI and non-SINI students both showed growth in these capacities, and SINI students closed a gap in word processing abilities by the end of the year.

By the end of the grant period, non-SINI students reported being less confident in their abilities to figure out the technology quickly. As the majority of non-SINI schools were not

implementing technologies by the end of the 2009-10 school, this decrease may be a result of students not having access to the new technologies at the beginning of the school year and being initially comfortable with the existing tools. After being introduced to new technologies in the 2010-11 school year, non-SINI students' confidence may have decreased.

Also, non-SINI students reported decreases in enjoyment and the amount they are encouraged to be creative, which may be a result of the normalization of technology, resulting in the loss of some novelty or fun factor. Interestingly, SINI students reported less noteworthy changes in their enjoyment of technology. Also, SINI students were much more likely than their non-SINI peers to find schoolwork easier to understand when using technology. This suggests that the tools may have a more meaningful impact on students in these SINIs than in these non-SINIs.

Grant resources were particularly valuable to SINI teachers in their use of technology to personalize learning activities and meet individual student needs, as the initial gap in perceived capacity in this area between the SINI and non-SINI teacher cohorts had closed by the end of the grant period. Ultimately, improved differentiated learning was a grant outcome lauded by participants in both groups.

5. How are grantees doing in terms of training teachers not only how to use technology but also how to translate their new skills into practice in their teaching?
District on-site professional development sessions remained the predominant training source for the majority of participants, who reported that content was typically delivered by in-house staff members (e.g., technology integrators, library/media specialists). In some cases, external consultants and equipment vendors (e.g., Promethean, Smart Board) were also brought in to lead workshops.

Online learning communities (OLCs) for professional development were used by ARRA educators far more readily than among non-participating teachers, indicating an emphasis on a community of practice among those integrating the grant resources.

Educators cited time as a considerable area of need – time to learn about, plan around, experiment with, and share tech-enabled practices and strategies. Also, over 74 percent of administrators reported *some* or *very great need* to address ISTE NETS-T areas for further teacher professional development. Training specific to core content areas, data analysis, and the optimization of interactive whiteboards also remained priorities for further development.

<u>Classroom Technology Mini-Grants</u>
1. How well are school staff members turning classrooms into technology-rich learning environments, fully equipped with hardware, software, and rich digital resources for learning?
At the school- and district-level, Mini-Grant participants have a variety of technology tools and supports in place that allowed for increased technology use by teachers and students. In particular, teachers were much more frequently using digital presentation, media, and handheld tools, as well as netbooks, interactive whiteboards, and assistive technology. With the increased availability of technologies, increased teacher use, and increased teacher comfort and proficiency with technology, it is not surprising that teachers reported they are able to design lessons using

digital tools that meet instructional objectives more frequently after the grant than they did before.

As might be expected with the increase in teachers' comfort and use of technology, substantial increases in student technology use were also reported. Student use increased for many types of activities, such as presenting and writing/creating.

Mini-Grant educators also generally reported the presence of a culture of support in their districts and schools regarding the integration of technology into instruction, and all educators believed instructional technology improves learning.

2. To what degree are these settings encouraging mediating outcomes for students including interactive learning, higher-level thinking skills, and student engagement?
Following project implementation, over 25 percent more teachers *strongly agreed* that students are engaged, motivated, and able to stay on task when they use technology. Teachers also noted changes in students' technology use for specific learning purposes (e.g., explaining ideas, collaborating, reflecting, constructing knowledge), some of which target interactive learning and higher-level thinking skills.

Additional professional development to target technology use for interactive learning or higher-level thinking skills may be beneficial for teachers. With additional time, students will also continue to familiarize themselves with the technologies and opportunities for interactive learning, and more advanced cognitive levels of student learning may continue to arise.

3. To what degree does the provision of technology tools translate into real opportunities for students to collaborate and connect with new content?
Mini-Grant teachers reported increases in the use of technology in many student activities, including a 36.7 percent increase in student use of technology for collaboration. In addition, students working in small groups and doing partner work substantially increased, allowing students more opportunities to collaborate with and learn from their peers. However, the percentage of eighth graders who met the ICT standard of *communication and collaboration* was the lowest percentage, indicating there is room to improve students' collaboration skills.

4. How are new technologies and resources serving students of various groups, including those with the highest need?
Both SINI and non-SINI educators reported increases in their abilities to use digital tools to personalize learning activities; however, these SINI educators reported lower abilities than non-SINI educators at both pre- and post-project. Project managers completing the NH Case Study Report, however, reported increases in teachers' abilities to utilize technologies for various student learning styles and groups. As teachers continue to become more comfortable using technology, more opportunities to individualize and differentiate instruction to students in need may arise.

5. How are grantees doing in terms of training teachers not only how to use technology but also how to translate their new skills into practice in their teaching?

In general, administrators reported that most teachers participated in on-site professional development during the 2010-11 school year. Teachers also reported an increase in their participation in OLCs after the grant. While some educators provided no recommendations for changes in training, many felt the need for more hands-on practice during professional development.

Most administrators reported that *using data analysis to inform classroom instruction* was the *highest* priority for teacher training topics. Administrators also felt that content-based (e.g., improving writing) training for their teachers is one of the *highest* priorities. Ultimately, these content-based training topics are essential ingredients for improving students' skills. Administrators reported being able to address ISTE NETS-T areas in trainings with teachers to some degree, though most administrators indicated *some need* for additional training in all areas.

Tech Leader Cohort (TLC) Program

1. How well are school staff members turning classrooms into technology-rich learning environments, fully equipped with hardware, software, and rich digital resources for learning?
TLC teachers pursued a variety of technology-enabled activities with students. They reported using an assortment of emerging technologies, such as digital handheld devices and online course management/digital portfolio systems. In doing so, teachers reported increases in more hands-on, constructivist activities in their classrooms (e.g., research, multimedia/graphical presentations and simulations).

TLC educators were dedicated to establishing a community of practice around technology-enhanced instruction. While 58.2 percent of TLC educators had previously collaborated with colleagues on enhancing instruction via technology a maximum of once or twice per month, the majority (64.2%) came to do so at least weekly post-grant. Ultimately, teachers were far more likely to assist their colleagues in developing their technology skills, share strategies with one another, and construct shared ideas about areas of growth moving forward at the conclusion of the grant than prior to the grant.

TLC teachers ultimately felt more comfortable and confident with using technology for student learning. Likewise, the percentage of teachers who *strongly agreed* that *using technology increases my instructional effectiveness* more than doubled at the conclusion of the grant. Also, nearly all teachers felt comfortable and proficient with technology. They were readily able to design lessons around technology and use it to personalize lessons for individual learning needs.

2. To what degree are these settings encouraging mediating outcomes for students including interactive learning, higher-level thinking skills, and student engagement?
As noted in RQ1, teachers pursued a variety of activities with students and subsequently ventured into a number of hands-on opportunities for student learning. Students readily grasped ICT competencies, and teachers increasingly reported that students were more engaged, motivated, and able to stay on task when using technology.

However, current practices suggested teachers could use more direction for augmenting higher-order thinking activities. As teachers continue to hone their technology-enhanced teaching

practices, providing teachers with professional development on technology use for interactive learning or higher-level thinking skills may be valuable.

3. To what degree does the provision of technology tools translate into real opportunities for students to collaborate and connect with new content?
Teachers reported increased opportunities for collaboration and multiple ways for students to connect to new content (e.g., constructing knowledge, solving authentic problems), as well as increases in students' collaboration and exploration either individually or in small groups during instructional time. In addition, administrators reported that most eighth graders (95.8%) met the ICT standard of *communication and collaboration.*

4. How are new technologies and resources serving students of various groups, including those with the highest need?
Both SINI and non-SINI educators reported increased abilities to use digital tools to personalize learning activities, and virtually no difference was noted between these SINI and non-SINI educators. With additional professional development and time to fully integrate technology into instruction, teachers may become even better equipped to individualize instruction to students.

5. How are grantees doing in terms of training teachers not only how to use technology but also how to translate their new skills into practice in their teaching?
Administrators reported that many teachers participated in on-site professional development in 2010-11. On the whole, many administrators reported content-based professional development topics (e.g., improving instruction in core content areas, improving writing, instruction based on NH math standards) as the *highest* priorities. Eventually, these content-based training topics should lead to a direct impact on students' skill levels.

Also, administrators reported addressing some ISTE NETS-T areas in professional development, but several reported additional needs to address those areas. Teachers also recommended providing more hands-on time during professional development, as well as a need to better understand how to integrate technology into their curriculum.

Based on main findings stemming from the research questions, we offer the following recommendations:

Recommendation 1: Ensure there are strong technology infrastructures and technical support staff in place prior to implementation.

Recommendation 2: To the extent possible, address causes to minimize delays in the purchasing and deployment of new technologies.

Recommendation 3: Ensure grantees effectively communicate the project goals and outcomes to all stakeholders.

Recommendation 4: Capitalize on the increased appreciation for and excitement surrounding school technology integration for project sustainability.

Recommendation 5: Continue to provide teachers with high-quality, relevant, focused professional development opportunities.

Recommendation 6: Continue to provide teachers and students with the positive support and encouragement needed to facilitate their technology implementation and use.

Recommendation 7: Expand existing supports to facilitate nuanced applications of technology resources and higher-order instructional approaches.

Recommendation 8: Provide additional assistance to schools in need of improvement (SINIs) for obtaining their full allocation of resources and identifying strategies for putting the resources to use.

Recommendation 9: Budget and provide time for teachers to learn, plan and share information about new technologies.

Recommendation 10: Encourage more discussions among educators about the benefits of allowing students to access the school network from home.

Recommendation 11: Provide teachers will the skills needed to deliver challenging and engaging technology applications to students and experiment with new instructional practices involving technology.

Recommendation 12: Provide schools/districts with guidance and tools (both short-term and long-term) to help them evaluate the impact(s) the technology is having on student achievement.

Recommendation 13: Provide guidance to educators on best practices for using technology for differentiated learning.

I. Introduction

The No Child Left Behind (NCLB) Act of 2001 reauthorized the Elementary and Secondary Education Act (ESEA) of 1965 and consolidated the Technology Literacy Challenge Fund (TLCF) Program and the Technology Innovative Challenge Grant Program into a single state formula grant program (ESEA Title II, Part D, Subpart 1). The Title II-D grant program, "Enhancing Education Through Technology," (EETT) provides financial assistance to higher poverty school districts that have the greatest need for technology support or have been identified as being in need of improvement. In 2009, the American Reinvestment and Recovery Act (ARRA) provided an additional $650 million in Title II-D funding to schools. With the ARRA Ed Tech funds, state educational agencies had the opportunity to implement 21st century classrooms in their schools with the goals of enhancing instruction, facilitating teaching and learning, and improving student achievement.

Through both EETT regular and ARRA grant funds, the New Hampshire Department of Education (NHDOE) funded three technology-focused projects beginning in Fall 2009: (a) ARRA 21st Century Classrooms, (b) Classroom Technology Mini-Grants, and (c) the Tech Leader Cohort (TLC) Program. Due to the differing objectives, timelines, and data collection requirements for each of these grant programs, they are described separately in this report.

ARRA 21st Century Classrooms
ARRA Ed Tech grant funds were given to 19 districts across the state to purchase and implement new technologies to create 21st century K-12 classrooms. The implementation varied by site and individual project descriptions are described in section III.A.3.

Classroom Technology Mini-Grants
The NHDOE also used regular EETT grant monies to fund "exemplary projects" in 35 districts that used technology in core content areas and could easily be shared and replicated.[1] Each grant recipient received $10,000, with at least $2,500 being used for professional development. Specific project and participation requirements were outlined by the NHDOE (see section III.A.2 of this report).

Tech Leader Cohort (TLC) Program
Using regular EETT funds, the NHDOE provided funding to four lead districts in the state to offer high-quality professional development to school administrators and teachers. A total of 47 school teams, consisting of two teacher leaders and one supporting principal per school, explored resources and approaches for creating 21st century learning environments that combined face-to-face learning with online learning. Each of the four districts coordinated and hosted TLC activities to ensure a common experience for participants.

Federal guidelines for the EETT grant program require that districts have a means of evaluating the extent to which grant activities are effective in the following: (a) integrating technology into curricula and instruction; (b) increasing the ability of teachers to teach; and (c) enabling students

[1] http://www.nheon.org/oet/nclb/2009-10/TitleIID-Round8-RFP2009-10.htm#_Toc240762266

to meet challenging state standards. To this end, the NHDOE worked with a consortium of district grantees to select Hezel Associates, LLC to conduct a statewide evaluation of their Title II-D grant program.

The evaluation intends to provide a statewide perspective on how grant recipients are using technology and targeted professional development to implement 21st century classrooms, and how these environments are affecting teacher instruction and student learning. Even though the grants provided extensive latitude to the recipients in how to develop their programs, all of the grants share the three goals listed above. Therefore, the evaluation approach employed by Hezel Associates is a statewide evaluation of all funded activities using a common set of outcome measures.

This final evaluation report focuses on the program effectiveness, transparency, accountability, and equity of Title II-D grant program activities in the state of New Hampshire. This includes the 19 districts receiving ARRA Ed Tech funding, four districts receiving Ed Tech funding for the Tech Leader Cohort (TLC) program, and 35 districts receiving Ed Tech funding for Classroom Technology Mini-grants. In doing so, there are three main objectives:

Objective 1. Assess the degree to which districts receiving Title II-D Ed Tech funding are integrating technology into curricula and instruction as a result of project implementation.

Objective 2. Assess the degree to which districts receiving Title II-D Ed Tech funding have increased the abilities of teachers to teach as a result of project implementation.

Objective 3. Assess the degree to which districts receiving Title II-D Ed Tech funding are enabling students to meet challenging state academic standards as a result of project implementation.

Five research questions were developed by Hezel Associates to focus the evaluation and to help assess whether the evaluation objectives have been met. These five research questions are at the crux of all evaluation instrumentation, analysis, and reporting for these grant programs (see section IV.B for more information).

Hezel Associates is the sole external evaluator for New Hampshire's (NH) statewide evaluation of these grant programs. This report was prepared by Hezel Associates, in coordination with Nashua School District and the NHDOE. The NHDOE, with input from Nashua, was responsible for the completion of section II and section III.B of this report, and Hezel Associates was responsible for the completion of all other sections.

The evaluation timetables for the ARRA 21st Century Classrooms and TLC Program/Classroom Technology Mini-Grants are provided in Tables 1 and 2, respectively. The statewide evaluation began in March 2010 and concluded in August 2011. The total allocation for the evaluation is $257,721. At the time of the final report writing, it is expected that 100% of the allocated amount was used during the life of the project.

Table 1. ARRA 21st Century Classrooms Timetable

ARRA	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug
	School Year 2009-2010						School Year 2010-2011											
Evaluation Contract Signed	■																	
Spring 2010 Instrument Development	■	■	■															
Spring 2010 Instrument Implementation	■	■		■														
Spring 2010 Data Analysis & Site-Level Reporting					■	■												
USDOE Reporting for School Year 2009-10							■	■	■									
Fall 2010 Instrument Development					■	■												
Fall 2010 Instrument Implementation							■	■										
Fall 2010 Data Analysis & Site-Level Reporting										■	■							
Spring 2011 Instrument Implementation												■	■	■	■	■		
Spring 2011 Data Analysis & Site-Level Reporting																■	■	■
USDOE Reporting for School Year 2010-11																■	■	■

Table 2. TLC Program/Classroom Technology Mini-Grants Timetable

TLC/Mini-Grants	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug
	School Year 2009-2010						School Year 2010-2011											
Evaluation Contract Signed	■																	
Fall 2010 Instrument Development (includes retrospective pre-test and post-test)							■											
Fall 2010 Instrument Implementation								■	■									
Spring 2011 Instrument Implementation												■	■	■	■			
Spring 2011 Data Analysis																■	■	■
USDOE Reporting for School Year 2010-11																■	■	■

The structure of this report follows the guidelines provided by the U.S. Department of Education (ED). The next section (section II) describes the funds allocated for the Ed Tech grant program and provides context for the evaluation. Section III details the activities being evaluated at the school and district level. The scope, objectives, research questions, and methods for the evaluation are described in section IV, followed by the evaluation findings in section V. Section VI concludes the report with recommendations and lessons learned.

II. State Ed Tech Program Context

A. Summary: State Ed Tech Allocations and Awards

1. Total amount of FY 2009 funding for the State

FY 2009 ARRA Allocation	FY 2009 Regular Allocation	Total FY 2009 Allocation
$3,209,375.00	$1,305,843.00	$4,515,218.00

2. The number, percent and amounts of FY 2009 grants awarded competitively and by formula based on the FY 2009 appropriation (the combined total of ARRA and regular funds).

Type of Award	Number of Awards	Percent of Awarded Funds	Range of Award Amounts (Lowest-Highest)	Average (Mean) Award Amount
Competitive: ARRA 21st Century Classrooms	22	80%	$29,310.00 - $479,663.25	$149,492.10
Competitive: Classroom Technology Mini Grants Program	35	8%	$8,080.25 - $25,233.79	$9,893.93
Competitive: Tech Leader Cohort Program (TLC)	4	12%	$76,564.11 - $238,458.80	$126,212.78

B. Competitive Grant Program Descriptio

The New Hampshire 21st Century Classrooms program, funded by federal ESEA Title II-D, had an overall goal of providing grants to school districts and/or consortia of school districts to transform the learning environment through the substantial, innovative integration of educational technology and information literacy into their practices, in order to advance student learning.

New Hampshire's competitive grants program aligned with the state's educational improvement goals by supporting (a) teachers and leaders with online and onsite professional development powered by technology, (b) teams of teachers with project based learning mini-grants to infuse digital learning resources into their classrooms, and (c) grants to higher poverty school districts to create digitally rich learning environments.

With these grants, teachers were assisted in the design and delivery of technology integrated with curriculum and instruction, while their school administrators were supported in acquiring the competencies of a 21st century leader.

The emphasis on developing a comprehensive evaluation process and set of instruments for data collection will result in a greater ability at the local and state levels to identify those characteristics of teaching and learning which contribute to teacher effectiveness and student achievement. The provision of resources to create digitally rich classrooms was intended to drive further innovations in the learning process.

III. The Activity

A. Features

Through both EETT grant funds and ARRA Ed Tech funds, the NHDOE was able to fund three technology-focused projects: (a) ARRA 21st Century Classrooms, (b) Classroom Technology Mini-Grants, and (c) TLC Program. A description of each grant program is below, along with example project summaries for the TLC and Classroom Technology Mini-Grants, and full project descriptions for all districts implementing ARRA/Title II-D grants.

1. ARRA 21st Century Classrooms

The NHDOE provided funding to 19 districts across the state to purchase and implement new technologies to create 21st century K-12 classrooms. Project descriptions for all districts receiving ARRA Ed Tech grant funds can be found below.[2] All districts receiving ARRA Ed Tech grant funds were required to complete evaluation instruments/surveys created by Hezel Associates and instruments created by NHDOE, including a Walkthrough Observation Tool, Educator Survey, Student Survey, NH School Technology and Readiness (STaR) Chart, NH District Technology Survey, and NH School Technology Surveys. Districts that created their own local, site-specific instruments are noted below.

Alton School District

Alton School District's project evaluates the effects of technology on writing, mathematics, and science in the middle school grade levels. The project looks at the effects of technology on two 1:1 technology classrooms, in comparison to classrooms with fewer or no technology. In addition, those classrooms implementing a 1:1 technology environment have access to student netbooks and thin clients, and data collected are analyzed to measure the effectiveness of these differing technologies. Outcomes are measured using a pre- and post-test in science and mathematics, specifically, teacher assessments and the Northwest Evaluation Association (NWEA) scores for these subject areas. Writing skills are evaluated using the New England Common Assessment Program (NECAP) assessments, and objectivity will be ensured by using a state-generated rubric for grading, and the use of an external scoring team.

In addition to using the evaluation instruments noted above, Alton is evaluating its success through the use of local, site-specific instruments (writing and technology surveys for teachers and students). Alton began project implementation in April 2010. The project involves 145 students in grades 7-8 and three educators.

Bartlett School District

Bartlett School District's project objectives are to change the way teachers teach and students learn through technology. The main research question they aim to answer is: "Will 1:1 NEO2 word processors change the way teachers teach and students learn?" Bartlett's primary goal is to create a 1:1 computing environment using NEO2 word processors in two of their grades 1 and 2

[2] Project descriptions appear in present tense as the evaluation team was unable to verify whether all activities were completed as planned.

looping classrooms, where teachers will instruct the same group of students for two years. Bartlett's secondary goal is to combine technology with job-embedded professional development, transforming the school into an "education portal of the future." Technologies to be used or purchased include interactive whiteboards, teacher laptops, projectors, student response systems, document cameras, Flip cameras, NEO2 word processors, and printers. Bartlett's project focuses on four specific skill areas: Improving Writing, Scientific Inquiry and Critical Thinking Skills, Science Skills for Information, Communication and Media Literacy and ICT.

Bartlett began its implementation in January 2010. The project involves 22 students in grades 1-3 and two educators.[3]

Chester School District

Chester School District's project is founded on the phrase "First Use Must Inspire Future Use" and is a school-wide initiative focusing on reading and language arts. Chester anticipates that the use of interactive whiteboards, personal response systems, document cameras, laptops, and other digital tools will enhance teaching and learning and increase student involvement and performance. In this technology-rich environment, the needs of visual, auditory, and kinesthetic learners will be met. The integration of technology with reading and language arts provides learners with 21st century classrooms.

In addition to using the evaluation instruments noted above, Chester is evaluating its success through the use of its own local, site-specific instruments (reading literacy skills assessments [e.g., DIBELS], teacher rubrics and impromptu surveys). Chester began its implementation in February 2010. The project involves 145 students in grades 1 and 3-8 and nine educators.

Claremont and Unity School Districts

Claremont and Unity School Districts' project focuses on creating a 1:1 or 5:1 computing environment to enhance math instruction in elementary and middle school grade levels and to improve learning for students of all abilities. "Tools of Learning," the math intervention model being implemented integrates 21st century technology into the existing curriculum to deliver differentiated instruction to students. The technology purchased includes interactive white boards, student response systems, netbooks, flash drives, digital cameras, video cameras, mp3 players, and grade-level specific educational software. Professional development is provided through a summer institute, monthly onsite trainings, vendor-specific workshops, and the annual Christa McAuliffe Technology Conference, and demonstrates how technology can be used to enhance math instruction. Desired outcomes of the project include increased student test scores, increased student and teacher engagement, and increased access to technology in the classroom.

In addition to using the evaluation instruments noted above, Claremont and Unity is evaluating their success through the use of their own local, site-specific instruments (math proficiency test for students and an assessment that measures knowledge, skills, and attitudes about technology access and use in classrooms for teachers and administrators). Claremont and Unity began their

[3] The technology rotated to stay with the students for the duration of 2 years.

implementation in January 2010. The project involves 176 students in grades 2-8 and 10 educators.

Laconia School District

Laconia School District's project focuses on transforming existing learning environments through the integration of educational technology and curriculum to advance student learning. In addition, the project provides support to teachers and Principal through robust professional development. The primary configuration of technology tools includes five classrooms equipped with teacher laptops, interactive whiteboards with projectors, netbook carts, digital/document/video cameras, printers, and software, which facilitates 1:1 or 2:1 use of digital tools by students.

In addition to using the evaluation instruments noted above, Laconia is evaluating its success through the use of their own local, site-specific student survey and staff journal. Laconia began its implementation in March 2010. The project involves 85 students in grades K-5 and five educators.

Lafayette Regional School District

Lafayette Regional School District's project aims to create interactive classrooms in Grades K-6 through project-based learning and a 1:1 student to computer ratio. Lafayette purchased laptops, student response systems, document cameras, and a portable Mac lab to support the goals of their project. Desired outcomes of the project include improved student literacy skills, increased student engagement, and the promotion of higher order thinking skills in math, science, reading, and history subject areas.

Lafayette began its implementation in January 2010. The project involves 101 students in grades K-6 and 14 educators.

Manchester School District

Manchester School District's project aims to use technology to increase student learning and achievement in language arts classrooms. Manchester intends to increase the use of technology in the classroom by implementing computer carts in middle school classrooms (Grades 6-8) and by providing professional development on integrating technology tools into languages arts curricula for teachers. A desired outcome of this project is that students will be technology literate by eighth grade through the use of digital portfolios.

Manchester began its implementation in March 2010. The project involves 3385 students in Grades 6-8 and 55 educators.

Milton School District

The Milton School District is implementing a 1:1 netbook computer program and interactive white boards in select fifth grade, seventh grade, eighth grade, and high school math classrooms. It is anticipated that the combination of professional development in technology and leadership for teachers and technology hardware in the classrooms will improve student access to information and increase their knowledge base and interest in math and science. The

technological tools are used to support math and science curriculum, increasing students' preparedness for the workplace or higher education, once they complete high school.

In addition to using the evaluation instruments noted above, Milton is evaluating its success through its own local, site-specific instruments. These instruments include measurement of student goals, longitudinal surveys of student attendance records, survey of annual student attitudes, student performance (e.g., electronic portfolios), case studies on involved students, and sample student work. Milton's implementation began in November 2009. The project involves 249 students in Grade 5 and Grades 7-12 and four educators.

Nashua School District

Nashua School District's project aims to demonstrate how the integration of technology can result in changes in both teaching practices and student achievement. Nashua utilizes the revised science curriculum model as a way to infuse technology into all curriculum areas. Through the use of digital tools, including netbooks, Eno boards, student response systems, document cameras, flip cameras, and science probes, educators are able to create technology-rich lessons aimed to foster a student collaborative model and a 21st century learning environment.

In addition to using the evaluation instruments noted above, Nashua is evaluating its success through the use its own local, site-specific instruments (Common Formative assessments, developed by school teams). Nashua began its implementation in April 2010. The project involves 132 students in Grades 2 and 5 and six educators.

Northumberland School District

Northumberland School District aims to answer the following question: How do we transform fifth through eighth grade classrooms to meet the needs of the new digital learner? The goal of the project is to enhance curriculum and instruction through the use of teacher and student integrated technology, encouraging students to be actively engaged and evaluate their own progress. Collaborative projects are being implemented and include the use of videotaped activities, interactive Smart Board lessons, iRespond student interaction, and daily connections with wikis, blogs, and pre/post assessments to promote higher-order thinking skills.

In addition to using the evaluation instruments noted above, Northumberland is evaluating its success through the use of its own local, site-specific instrument (teachers were surveyed to better understand their skill levels and training needs). Northumberland's implementation began in April 2010. The project involves 138 students in Grades 5-8 and six educators.

Oyster River School District

Oyster River School District's project focuses on the exploration of the outside world with digital tools. Students use technology to explore the ecosystem of the Lamprey River, including the different habitats in the ecosystem as well as the varied flora and fauna. Oyster River purchased interactive whiteboards, student response systems, netbooks, document cameras, and science probes with the grant funds. The integration of these tools supports a 1:1 student to computer ratio and is used during hands-on lessons to reinforce instruction. Additionally, Oyster River is providing students with technology in a 3:1 digital tool ratio through interactive

whiteboards, with the goals of helping students relate learning to real-life applications and increase students' comprehension of science and math concepts.

In addition to using the evaluation instruments noted above, Oyster River is evaluating its success through the use of their own local, site-specific instruments. Local, site-specific instruments measure motivation levels through, including a Teacher Engagement Survey, classroom observations, and a Student Engagement Survey. Oyster River's implementation began in December 2009. The project involves 360 students in Grades 3-4 and 8-12 and 11 educators.

Pembroke Collaborative SAU 53

Pembroke Collaborative SAU 53 aims to increase student achievement in science for Grades K-12 through the integration of a hands-on inquiry approach to science and technology. Technology equipment purchases, professional development, in-depth curriculum alignment, action research, and a commitment to higher-order cognitive processes supplement the continued work of four high-need collaborative districts as they move toward student centered learning and implementation of technology-rich 21st century classrooms. Goals of the project include changes in teacher instruction (e.g., facilitation vs. traditional instruction; development of lessons that challenge students to higher order cognitive processes; engagement with the curriculum and with technology through inquiry) and an increase in student research that is both self-directed and based on primary research. Pembroke purchased laptops, mobile laptop carts, interactive white boards, video cameras, science probes (including electronic, motion, temperature, biology, and chemistry probes), document cameras, digital microscopes, weather stations, high speed cameras, and software.

In addition to using the evaluation instruments noted above, Pembroke is evaluating its success through the use of NECAP science scores (for student outcomes). Pembroke's implementation began in December 2009. The project involves 919 students in Grades K-1 and 4-12 and 22 educators.

Pittsfield School District

Pittsfield School District aims to increase teachers' new media literacy skills through technology and Web 2.0 tools. Professional development is being provided to teachers to help them learn the new technology and Web 2.0 tools. Desired outcomes of the project include increased teacher and student collaboration to create inquiry- and project- based studies and opportunities for students to publish original work, collaborate with others, and participate in digital learning communities. Pittsfield purchased interactive whiteboards and netbooks.

Pittsfield's implementation began in December 2009. The project involves 204 students in Grades 1-4 and 7-12 and eight educators.

Portsmouth SAU 52

Portsmouth SAU 52's project equips math classes with technology tools, with the goal of enhancing the curriculum, motivating students, improving instruction, and assessing student learning. The technology being implemented includes interactive whiteboards, student response systems, document cameras, LCD projectors, and mobile labs. It is anticipated that the

multimedia, multi-sensory, and multi-dimensional lessons will impact students' math knowledge, students' cognitive thinking skills, and students' and teachers' technology literacy skills.

Portsmouth's implementation began in January 2010. The project involves 530 students in Grades 6-8 and 12 educators.

Profile School District

Profile School District aims to use technology to increase student engagement and student achievement in all grade levels and subject areas by providing individualized access to technology. Through the purchase of new technology, such as netbooks and accessories (including carry-on bags for netbooks, dual-band wireless routers and access points to ensure connection throughout the building), Profile anticipates that these technology tools will help meet the district's goals. In addition, Profile purchased interactive whiteboards through other grant funds, but will be fully deploying the whiteboards (including four days of training) through ARRA funds. Training is being provided to teachers on both the equipment and skills necessary for the integration of technology into curricula.

In addition to using the evaluation instruments noted above, Profile is evaluating its success through the use of their own local, site-specific post-training survey for teachers. Profile began its implementation in February 2010. The project involves 272 students in Grades 7-12 and 28 educators.

Raymond School District

Raymond School District's project aims to improve students' learning skills and strategies in the subject areas of reading, writing, and vocabulary development. Through the purchase of new technology (e.g., Smart Boards, LCD projectors, laptops and netbooks), Raymond anticipates that these technology tools will enhance teaching and learning. In order to improve students' skills, Raymond will train and support teachers on how to effectively integrate technology into their classroom, differentiate their instruction, and to engage and instruct all students.

Raymond began its implementation in January 2010. The project involves 220 students in Grades 3-4 and 12 educators.

Somersworth School District

Somersworth School District's project aims to increase student and teacher technology skill levels to improve student learning. Through the purchase of iPod Touches, digital projectors, interactive whiteboards, netbooks (for students and teachers), and software, Somersworth is providing 1:1 mobile technology access to students. Student and teacher technology skill levels are measured using the International Society for Technology in Education (ISTE) National Education Technology Standard for Students (NETS-S) and the NETS for teachers (NETS-T). The technology is shared by faculty "teams" and the teams assess their learning outcomes. In addition to the new technology, teachers are receiving professional development that focuses on technology integration tools, strategies, and resources.

In addition to using the evaluation instruments noted above, Somersworth is evaluating its success through the use of their own local, site-specific instrument (informal weekly checklist for

teachers to tally the types and frequencies of technology use in the classroom). Somersworth began its implementation in January 2010. The project involves 133 students in Grades 6-7 and eight educators.

Timberlane Regional School District

Timberlane Regional School District's project aims to use technology to enhance students' creativity, innovation, and academic performance in science. Through the purchase and use of tablets, laptops (for teachers), netbooks, iPods, projectors, student response clickers, flip video cameras, document cameras, and software, Timberlane is providing students and teachers with the knowledge, skills, and expertise needed to succeed in a 21st century world. Students' scientific literacy and problem solving skills, as measured by the ICT Literacy Standards, as well as district standards are serving as a student performance outcome measure.

In addition to using the evaluation instruments noted above, Timberlane is evaluating its success through the use of the Mid-continent Research for Education and Learning (McREL) Power Walkthrough. This instrument is implemented by administrators using a personal digital assistant (PDA) to record informal observations of classrooms. Timberlane began its implementation in April 2010. The project involves 400 students in Grades 6-8 and six educators.

White Mountain Regional School District

The White Mountain School District's project aims to increase students' critical thinking skills and strengthen the foundations of its schools to implement 21st Century Classrooms. To achieve this goal, the district initially provided professional development on Levels of Teaching Innovations (LoTi) principles, with the overall goals of supporting effective teaching practices and increasing students' test scores on the NECAP, thus improving the district's LoTi standing. White Mountain purchased new technology to support their project, including laptops (for teachers), Promethean Boards, student response systems, and LCD projectors to create a 1:1 digital tool environment for classes in all schools. However, challenges emerged over the course of the grant such as the high cost of LoTi training and superintendent turnover, which resulted in the district reviewing its priorities and pursuing new avenues for professional development. The district ultimately developed a relationship with Antioch University's Center for School Renewal, which offers a Critical Skills program addressing higher order thinking, communication and collaboration, problem-based, experiential, and standards-based learning with a seamless integration of technology.

In addition to using the evaluation instruments noted above, White Mountain is evaluating its program through the use of surveys developed by other external organizations (e.g., LoTi), as well as an assessment/review of its District Technology Curriculum. White Mountains began its implementation in December 2009. The project involves 104 students in Grades 2-4, 8, 10-11 and six educators.

2. Classroom Technology Mini-Grants

The NHDOE provided funding to 35 districts statewide to create "exemplary projects" that would use technology in core content areas and could easily be shared and replicated. The core content areas included: The Arts, English Language Arts, Mathematics, Science, Social Studies,

and/or World Languages, and all projects must also address Information and Communication Technologies (ICT) literacy skills.[4] Projects were carried out by teams of 2-4 educators from each school, and used project/problem-based learning with a constructivist approach. Specific project expectations and requirements were outlined by the NHDOE and included the production of a three-minute video, lesson plan, assessment rubric, and other related documentation to indicate how the project was carried out, attendance at after-school mini-grant meetings, and a final presentation of the project at the annual Mini-Grant Celebration. Three examples of classroom technology mini-grants that were implemented in 2009-10 are presented below.

Amherst Middle School

Amherst used technology (podcasts and student created videos) to improve student literacy by helping students make connections with humanitarian issues around the world and organizations that are making a difference.

The goals of the project included: (a) train staff and students on how to select organizations that demonstrate a great impact on people; (b) train staff and students on how to maximize the use of the new technology; and (c) train staff and students on video and multimedia. Student-directed i-movies were showcased in an annual Oxfam Hunger Banquet for the entire 7th grade, and faculty, students, and parents were invited to attend. During this event, students shared their knowledge with others and experienced firsthand how one person can make a difference in the world. The project involved 214 seventh grade students and four teachers.

Chester Academy

Chester Academy used digital tools (Webkinz.com, interactive whiteboards, computers, document camera, digital cameras, digital voice recorders, and *Kidspiration*) to increase student engagement. Students in 2nd grade adopted *Webkinz* animals to learn about animal habitats and the resources needed for their survival, using a virtual environment. Students also explored the physical geography of the seven continents, and discussed the needs of wild animals versus those in captivity. Using their research, students created classroom habitats that simulated animals' actual habitats and wrote electronic/digital survival guides for each animal.

The goals of the project included: (a) student identification of animals, their needs, and their habitats; (b) the identification of continents and the animals that live there; (c) participation in group decision making and collaboration; (d) safe use of the Internet; (e) integration of math concepts into everyday life; (f) practice reading at independent fluency levels; (g) publication of an Animal Survival Guide (paper and digital); and (h) creation of an artifact for a student's personal digital portfolio. In addition, teachers would learn: (a) how to effectively use the interactive whiteboard in the classroom to enhance lessons and improve student achievement; (b) video production skills to enhance lessons, improve student achievement, and provide alternative assessments; and (c) how to create digital books that can be used to showcase student work. The project involved 31 second grade students and three teachers.

[4] From: http://www.nheon.org/oet/nclb/2009-10/TitleIID-Round8-RFP2009-10.htm#_Toc240762266

Rollinsford School District

Rollinsford's project aimed to use technology tools (FLIP video cameras and MP3 players) to increase student reading fluency and comprehension. The technology devices were used to practice and record Reader's Theater activities, which were then uploaded, saved, and listened to by students. This practice incorporated the three dimensions of fluency – accuracy, speed, and expression – and audio and video files were saved to ICT portfolios to measure progress. Teachers received professional development on the various technologies being used, as well as training on Web 2.0 tools for sharing student work and progress. The project involved 63 students in grades K-2 and nine educators.

3. Tech Leader Cohort (TLC) Program[5]

The NHDOE provided funding to four lead districts in the state to offer high-quality professional development to school administrators and teachers. The goal of the TLC Program was to "support a statewide cadre of skilled, informed teacher leaders and principals who are empowered to support their colleagues in creating truly 21st century learning environments"[6] Through the TLC grant program, each of the four districts coordinated specific activities targeted towards providing professional development. A total of 47 school teams – consisting of two teacher leaders and one supporting principal per school – explored resources and approaches for creating 21st century learning environments that combined face-to-face learning with online learning.

Districts were encouraged to participate in the following programs:

- *Project New Media Literacies* – New Media Literacies explored how educators might best equip young people with the social skills and cultural competencies required to become full participants in an emergent media landscape and raise public understanding about what it means to be literate in a globally interconnected, multicultural world.
- *Intel Thinking With Technology Course* – This course provided 24 to 40 hours (depending on the number of modules chosen) of professional development to teachers so that they could learn strategies for addressing and assessing thinking skills and learn how to use technology to develop a deeper understanding of core content.
- *Intel Teach Leadership Forum* - The Intel Teach Leadership Forum provided a 4-hour face-to-face professional development session focusing on the importance of leadership in promoting, supporting, and modeling the use of technology in instruction.
- *Online Professional Education Network New Hampshire (OPEN NH)* – This e-learning program provided online courses for professional development geared to school or district needs. Courses included several content areas and instructional topics.

Each lead district used grant funds to provide participants with observation subscriptions, handheld devices, stipends, and funds towards registration for the 21st Century Learner Conference, the Christa McAuliffe Conference, OPEN NH courses, and Local Education Support Center Network (LESCN) sessions.

[5] Description of the TLC program comes from the NHDOE RFP (http://www.nheon.org/oet/nclb/)
[6] From: http://www.nheon.org/oet/nclb/2009-10/TLCProgram.htm

Funds were awarded to a lead district (with a corresponding professional development center) and distributed to consortium schools that had demonstrated need for the funds. What follows is a brief description of each lead district's approach to the program, as well as an example of one participating school's individual program goals.

Exeter School District

The Seacoast Professional Development Center provided professional development that focused on incorporating technology (i.e. interactive whiteboards, handheld devices, and e-portfolios) into the classroom. In addition, the Center increased schools' capacities for mentorship opportunities in the area of emergent technologies. While each consortium member reported individual goals, most project goals focused on creating 21st century classrooms through the integration of technology.

Barrington School District participated in the TLC project through Exeter School District. Barrington's primary goal was to improve student learning and teacher effectiveness by integrating technology into classrooms and curricula. The district aimed to increase their capacity to develop student portfolios, curriculum maps, and performance pathways by participating in professional development. The TLC program supported the district's vision for technology integration in all classrooms, and provided extended training for the Technology Mentor Program, which aimed to increase professional development for staff at each grade level.

Keene School District

The SouthWest Center provided individualized technology-related professional development to each participating school, which aligned with schools' Technology Plans, when applicable.

Kearsarge School District participated in the TLC project through Keene School District. Kearsarge's goal for the grant was to ensure that all staff was provided with professional development that will enable effective and efficient technology integration into the classroom. Members of the Leadership Team received training through the TLC grant, which will be disseminated to others in the district. The grant was built on prior training sessions offered, such as Smart Board and Google docs.

Merrimack Valley School District

The Capital Area Center for Educational Support (CACES) aimed to provide teachers and administrators with the skills needed to create a digital-age culture in their school. Project participants were trained on new technologies that can be used to improve student achievement, and modeled ways to build students' complex problem solving skills in both a physical and virtual environment. Needs expressed by consortia teachers that CACES aimed to address included: increased abilities for teachers to integrate technologies into the classroom, open discussions of regulations to protect schools and students, and pedagogical skills that facilitate students' higher order thinking skills in the areas of synthesis, evaluation, and creativity. In addition to the aforementioned professional development, CACES encouraged teachers to develop a new unit of study that integrates technology in instruction, and at least one teacher was to participate in the New Media Literacies Early Adopters monthly webinar.

Pembroke Academy participated in the TLC project through Merrimack. Pembroke aimed to increase teachers' understanding of all Web 2.0 tools, and ways to integrate these tools into the classroom. In addition, Pembroke hoped to gain a better understanding of media literacy as it applies to students and their future.

Milan School District

North County Education Services aimed to engage project participants in developing lesson plans that utilize technology to engage students in higher order thinking. In addition to supporting the four TLC program activities mentioned above (e.g., Project New Media Literacies), North County Education Services provided an optional session on the iPod Touch.

Lisbon Regional School participated in the TLC project through Milan. Lisbon's goal was to have all teachers in the school designing lessons that utilized technology. Examples of technologies used included laptops, video conferencing programs, and interactive whiteboards.

B. Resources Allocated

21st Century Classrooms Initiative was funded at $3,438,318.25, representing 80 percent of the total Title II-D funds for the period. This amount includes ARRA funds plus a portion of regular funds. Services included an intense level of activity at the local, state, and national level to support the creation of technology rich learning environments supported by appropriate bandwidth, equipment infrastructure, and professional development. The total of the additional resources beyond the grant awards is estimated at $97,500. This amount does not include district in-kind costs such as additional staff time for training, purchasing, data collection, and such.

Classroom Technology Mini-grants Program was funded at $346,287.72, representing 8 percent of the total Title II-D funds for the period. Services included the following: (a) onsite and online training provided by staff at regional professional development centers, (b) online development of a webspace for mini-grant teams to post and discuss their work, (c) coordination by a regional PD center of an annual "Technology Celebration Event" to showcase the projects completed by each mini-grant team. The total of the additional resources beyond the grant awards is estimated at $12,000. This amount does not include district in-kind costs such as additional staff time for training, purchasing, data collection, and such.

The TLC Program was funded for a total of $504,851.13, representing 12 percent of the total Title II-D funds for the period. Services included the following: (a) staff at four regional professional development centers coordinated a limited number of onsite training activities for local teacher and administrator cohorts from area schools, (b) online course facilitation over a nine month period by a trained online facilitator, assisted by four mentors, (c) support in the form of materials, training, and technical assistance from the Intel Teach national program, and (c) ongoing course development and managerial support from SEA program staff. The total of the additional resources beyond the grant awards is estimated at $29,000. This amount does not include district in-kind costs such as additional staff time for training, purchasing, data collection, and such.

C. Scale and Complexity

Table 3 below represents the number of sites, districts, and schools participating in the ARRA/Title-II D grant. Demographics of the schools, including school enrollment, free/reduced lunch (being used to represent the percentage of families in poverty), in need of improvement status, and participation numbers for grade levels, classrooms, teachers, and students are presented.

Table 3. Scale and Complexity (ARRA/Title II-D Grant)

Site Name[1]	School Names[1]	Locale[2]	School enrollment[1]	Free / reduced lunch[1,3]	In need of improvement?[1]	Grade levels[4]	Number of Classrooms[4]	Number of Teachers[4]	Number of Students[4]
Alton School District	Alton Central School	Rural: Distant (42)	549	24.4%	No	7-8	5	3	145
Bartlett School District	Josiah Bartlett Elementary School	Rural: Remote (43)	273	35.8%	No	1-3	2	2	22
Chester School District*	Chester Academy	Rural: Fringe (41)	615	11.2%	Yes	1, 3-8	9	9	145
Claremont & Unity School Districts	Maple Avenue Elementary School [Claremont District*]	Rural: Fringe (41)	345	41.5%	Yes	4-5	5	5	94
	Unity Elementary School [Unity District*]	Town: Remote (33)	98	16.9%	Yes	2-8	4	5	82
Laconia School District*	Woodland Heights School	Town: Distant (32)	424	63.9%	Yes	K-5	5	5	85
Lafayette Regional School District	Lafayette Regional School	Rural: Distant (42)	101	16.7%	No	K-6	7	14	101
Manchester School District*	Hillside Middle School	City: Midsize (12)	912	39.9%	Yes	6-8	15	15	939
	Middle School at Parkside	City: Midsize (12)	713	60.3%	Yes	6-8	11	11	745
	Southside Middle School	City: Midsize (12)	861	53.1%	Yes	6-8	15	15	918
	Henry J. McLaughlin Middle School	City: Midsize (12)	824	49.4%	Yes	6-8	14	14	783
Milton School District*	Milton Elementary School	Rural: Fringe (41)	259	38.4%	Yes	5	1	1	25
	Nute Junior High School	Suburb: Small (23)	143	44.1%	No	7-8	1	1	102
	Nute High School	Suburb: Small (23)	203	36.0%	Yes	9-12	2	2	122
Nashua School District*	New Searles Elementary School	City: Small (13)	430	20.3%	Yes	2, 5	6	6	132
Northumberland School District	Groveton Elementary	Rural: Remote (43)	136	56.4%	No	5	2	2	31
	Groveton Middle School	Rural: Remote (43)	107	49.5%	No	6-8	4	4	107
Oyster River School District	Mast Way Elementary School	Rural: Fringe (41)	355	9.7%	No	3-4	4	4	80

Site Name[1]	School Names[1]	Locale[2]	School enrollment[1]	Free / reduced lunch[1,3]	In need of improvement?[1]	Grade levels[4]	Number of Classrooms[4]	Number of Teachers[4]	Number of Students[4]
	Moharimet Elementary School	Rural: Fringe (41)	381	4.4%	No	3-4	3	3	60
	Oyster River Middle School	Suburb: Small (23)	628	4.8%	Yes	8	2	2	160
	Oyster River High School	Suburb: Small (23)	673	4.2%	No	9-12	2	2	60
Pembroke Collaborative SAU 53	Allenstown Elementary School [Allenstown District*]	Town Fringe (31)	281	37.6%	Yes	1, 4	2	3	67
	Armand R. Dupont School [Allenstown District*]	Town: Fringe (31)	132	50.0%	Yes	6-8	2	2	81
	Deerfield Community School [Deerfield District*]	Rural: Distant (42)	516	13.2%	Yes	K, 4, 7-8	3	3	80
	Epsom Central School [Epsom District]	Rural: Distant (42)	427	26.4%	No	1, 5-8	4	4	227
	Pembroke Academy [Pembroke District]	Town: Fringe (31)	927	22.0%	No	9-12	7	7	341
	Pembroke Hill School [Pembroke District]	Rural: Fringe (41)	242	20.3%	No	4	1	1	19
	Pembroke Village School [Pembroke District]	Town: Fringe (31)	162	33.8%	No	K	1	1	18
	Three Rivers School [Pembroke District]	Town: Fringe (31)	352	29.3%	Yes	5	1	1	86
Pittsfield School District	Pittsfield Elementary School	Rural: Distant (42)	322	42.1%	Yes	1-4	4	4	63
	Pittsfield Middle School	Rural: Distant (42)	87	39.1%	Yes	7,8	4	1	67
	Pittsfield High School	Rural: Distant (42)	155	37.4%	No	9-12	6	3	74
Portsmouth SAU 52*	Portsmouth Middle School	Suburb: Small (23)	485	32.4%	Yes	6-8	11	12	530
Profile School District	Profile Junior High School	Rural: Fringe (41)	101	31.7%	No	7-12	26	28	272
	Profile Senior High School	Rural: Fringe (41)	171	25.3%	No	See above	See above	See above	See above
Raymond School District	Lamprey River Elementary School	Rural: Fringe (41)	570	30.3%	Yes	3-4	12	12	220
Somersworth School District*	Somersworth Middle School	Suburb: Small (23)	540	39.1%	Yes	6-7	8	8	133

Site Name[1]	School Names[1]	Locale[2]	School enrollment[1]	Free / reduced lunch[1,3]	In need of improvement?[1]	Grade levels[4]	Number of Classrooms[4]	Number of Teachers[4]	Number of Students[4]
Timberlane Regional School District	Timberlane Regional Middle School	Suburb: Large (21)	1042	14.1%	Yes	6-8	6	6	400
White Mountain Regional School District*	Lancaster Elementary School	Rural: Remote (43)	436	44.6%	Yes	4	1	1	18
	Whitefield Elementary School	Rural: Distant (42)	349	50.4%	Yes	8	2	2	28
	Jefferson Elementary School	Rural: Remote (43)	67	41.0%	No	2-3	2	2	27
	White Mountains Regional High School	Rural: Distant (42)	430	35.8%	Yes	10-11	2	1	31

[1] Information from the NHDOE [http://www.education.nh.gov (2010-11 school year)]
[2] Locale information from National Center for Education Statistics (NCES) [http://www.nces.ed.gov (obtained 9/15/2010)]
[3] Free/reduced lunch percentages from the NHDOE, and only include Grade 1 and above; this statistic is used to represent percentage of families in poverty
[4] Information from ARRA Project Managers; numbers represent those involved in the activity
*Denotes District In Need of Improvement (DINI)
**Denotes schools on NH's "Persistently Lowest-Achieving Schools" list, from:
http://www.education.nh.gov/instruction/integrated/documents/persistently_lowest_achieving_Schapril2011.pdf (updated 4/2011)

Table 4 below represents the number of districts and schools participating in Mini-Grants. Demographics of the schools, including school enrollment, free/reduced lunch (being used to represent the percentage of families in poverty), in need of improvement status, grade levels impacted, and number of team members and are presented.

Table 4. Scale and Complexity (Mini-Grant)

District Name[1]	School Names[1]	Locale[2]	School enrollment[1]	Free / reduced lunch[1,3]	In need of improvement?[1]	Grade levels[4]	Number of Team Members[4]
Alton School District	Alton Central School	Rural: Distant (42)	549	24.4%	No	3	2
Amherst School District*	Amherst Middle School	Suburb: Midsize (22)	798	5.4%	Yes	7	4
Ashland School District	Ashland Elementary School	Rural: Distant (42)	150	39.3%	No	4	4
Barrington School District*	Barrington Middle School	Rural: Fringe (41)	421	22.3%	Yes	8	4
Bartlett School District	Josiah Bartlett Elementary School	Rural: Remote (43)	273	35.8%	No	K-8	3
Chester School District*	Chester Academy	Rural: Fringe (41)	615	11.2%	Yes	2	3
Concord School District*	Rundlett Middle School	Town: Distant (32)	1068	33.0%	Yes	6	3
Derry School District*	Gilbert Hood Middle School	Suburb: Midsize (22)	807	26.9%	Yes	8	3
	West Running Brook Middle	Suburb: Midsize (22)	614	21.5%	Yes	8	3
Dover School District*	Garrison Elementary School	Suburb: Small (23)	436	17.4%	No	4	3
Epping School District	Epping Middle School	Rural: Fringe (41)	219	23.7%	Yes	8	3
Fall Mountain Regional School District*	Fall Mountain High School	Rural: Fringe (41)	600	28.5%	Yes	9-12	2
Farmington School District*	Henry Wilson Memorial**	Rural: Fringe (41)	559	49.9%	Yes	7-8	2
Hampstead School District	Hampstead Middle School	Suburb: Large (21)	416	6.0%	No	5-8	2
Inter-Lakes School District	Inter-Lakes Elementary School	Rural: Distant (42)	296	33.8%	Yes	3;8	4
Jaffrey-Rindge COOP School District*	Conant High School	Town: Distant (32)	515	24.5%	Yes	9-12	4
Keene School District*	Jonathan Daniels Elementary	Town: Distant (32)	152	25.0%	Yes	K-5	3
Laconia School District*	Pleasant Street School	Town: Distant (32)	250	54.4%	Yes	3;5	4
Lebanon School District*	Lebanon High School	Town: Remote (33)	718	12.5%	Yes	9-12	3
Litchfield School District	Campbell High School	Rural: Fringe (41)	515	8.9%	No	9-12	4
Littleton School District	Littleton High School**	Town: Remote (33)	263	34.6%	No	9-12	4
	Mildred C. Lakeway Elementary School	Town: Remote (33)	361	51.8%	Yes	1	
Merrimack Valley School District*	Merrimack Valley Middle School	Town: Distant (32)	629	30.4%	Yes	7	4
Milan School District	Milan Village School	Rural: Distant (42)	87	20.7%	No	5;6	3
Northumberland School District	Groveton High School	Rural: Remote (43)	133	43.6%	No	7-12	4
Oyster River School District	Oyster River High School	Suburb: Small (23)	695	4.2%	No	9-12	4
Pittsfield School District	Pittsfield Middle School	Rural: Distant (42)	87	39.1%	Yes	7,8	3
	Pittsfield High School	Rural: Distant (42)	181	30.9%	No	9-12	3
Portsmouth School District*	Portsmouth High School	Suburb: Small (23)	1119	18.7%	No	9	2
Profile School District	Profile Junior High School	Rural: Fringe (41)	101	31.7%	No	7-8	3

District Name[1]	School Names[1]	Locale[2]	School enrollment[1]	Free / reduced lunch[1,3]	In need of improvement?[1]	Grade levels[4]	Number of Team Members[4]
	Profile Senior High School	Rural: Fringe (41)	171	25.3%	No		
Prospect Mountain School District	Prospect Mountain High School	Rural: Distant (42)	547	25.1%	Yes	9-12	2
Raymond School District	Iber Holmes Gove Middle School	Town: Fringe (31)	453	31.8%	Yes	7	4
Rollinsford School District*	Rollinsford Grade School	Suburb: Small (23)	149	19.5%	Yes	K-2	3
Shaker Regional School District	Belmont Elementary School	Rural: Distant (42)	326	42.9%	No	PreK	4
Somersworth School District*	Maple Wood School	Suburb: Small (23)	367	42.2%	Yes	2-3	4
White Mountain Regional School District*	Lancaster Elementary School	Rural: Remote (43)	436	44.6%	Yes	4	4
	Whitefield Elementary School	Rural: Distant (42)	349	50.4%	Yes		
	Jefferson Elementary School	Rural: Remote (43)	67	41.0%	No		
Winnacunnet COOP School District	Winnacunnet	Suburb: Small (23)	1248	22.9%	No	9	3
Winnisquam Regional School District	Winnisquam Regional Middle School	Town: Distant (32)	357	34.7%	Yes	7-8	3

[1] Information from the NHDOE [http://www.education.nh.gov (2010-11 school year)]

[2] Locale information from National Center for Education Statistics (NCES) [http://www.nces.ed.gov (obtained 6/15/2011)]

[3] Free/reduced lunch percentages from the NHDOE, and only include Grade 1 and above; this statistic is used to represent percentage of families in poverty

[4] Information from grant applications

*Denotes District In Need of Improvement (DINI)

**Denotes schools on NH's "Persistently Lowest-Achieving Schools" list, from:
http://www.education.nh.gov/instruction/integrated/documents/persistently_lowest_achieving_Schapril2011.pdf (updated 4/2011)

Table 5 below represents the number of districts and schools participating in TLC grants via the four professional development centers. Demographics of the schools, including school enrollment, free/reduced lunch (being used to represent the percentage of families in poverty), and in need of improvement status are presented.

Table 5. Scale and Complexity (TLC Program)

Lead District / Professional Development Center	District Name[1]	School Name[1]	Locale[2]	School enrollment[1]	Free / reduced lunch[1,3]	In need of improvement?[1]
Exeter Regional School District / Seacoast Professional Development Center	Barrington School District*	Barrington Elementary School	Rural: Fringe (41)	427	17.6%	Yes
	Derry School District*	South Range Elementary School	Suburb: Midsize (22)	349	27.5%	No
	Farmington School District*	Farmington High School**	Rural: Fringe (41)	440	37.5%	Yes
	Rochester School District*	Gonic School	Suburb: Small (23)	219	42.0%	Yes
	Litchfield School District	Griffin Memorial	Rural: Fringe (41)	436	8.3%	Yes
	Portsmouth School District*	New Franklin	Suburb: Small (23)	217	34.6%	Yes
		Portsmouth Middle School	Suburb: Small (23)	485	32.4%	Yes
		Portsmouth High School	Suburb: Small (23)	1119	18.7%	No
	Raymond School District	Iber Holmes Gove Middle School	Town: Fringe (31)	453	31.8%	Yes
	Rollinsford School District*	Rollinsford Grade School	Suburb: Small (23)	149	19.5%	Yes
	Somersworth School District*	Maple Wood School	Suburb: Small (23)	367	42.2%	Yes
	Timberlane Regional School District	Atkinson Academy	Suburb: Large (21)	365	7.1%	No
		Danville	Suburb: Large (21)	323	19.2%	No
Keene School District / Southwestern NH Educational Support Center	Fall Mountain Regional School District*	Vilas Elementary School	Rural: Distant (42)	117	35.0%	No
		Charlestown Primary School	Rural: Fringe (41)	159	47.8%	Yes
		Fall Mountain High School	Rural: Fringe (41)	631	22.3%	Yes
		Walpole Primary School	Rural: Fringe (41)	45	31.1%	No
		North Walpole Elementary School	Rural: Fringe (41)	123	23.6%	Yes
		North Charlestown Community School	Rural: Fringe (41)	71	49.3%	No
	Kearsarge Regional School District	Kearsarge High School	Rural: Remote (43)	650	19.7%	Yes
	Keene School District*	Jonathan Daniels Elementary	Town: Distant (32)	152	25.0%	Yes
Merrimack Valley School District / Capital Area Center for Education Support	Alton School District	Alton Central School	Rural: Distant (42)	549	24.4%	No
	Chester School District*	Chester Academy	Rural: Fringe (41)	615	11.2%	Yes
	Deerfield School District*	Deerfield Community School	Rural: Distant (42)	516	13.2%	Yes
	Franklin School District*	Franklin Middle School**	Town: Distant (32)	416	66.4%	Yes

Lead District / Professional Development Center	District Name[1]	School Name[1]	Locale[2]	School enrollment[1]	Free / reduced lunch[1,3]	In need of improvement?[1]
	Laconia School District*	Elm Street School	Town: Distant (32)	225	57.8%	Yes
	Merrimack Valley	Merrimack Valley Middle School	Town: Distant (32)	629	30.4%	Yes
	Pembroke School District	Pembroke Academy	Town: Fringe (31)	927	22.0%	No
	Pittsfield School District	Pittsfield Elementary School	Rural: Distant (42)	322	42.1%	Yes
		Pittsfield Middle School	Rural: Distant (42)	87	39.1%	Yes
		Pittsfield High School	Rural: Distant (42)	155	37.4%	No
	Winnisquam School District	Winnisquam Regional Middle School	Town: Distant (32)	357	34.7%	Yes
Milan School District / North Country Education Services	Bethlehem School District*	Bethlehem Elementary School	Rural: Distant (42)	160	48.1%	Yes
	Conway School District*	Kennett Middle School	Rural: Remote (43)	322	31.1%	Yes
	Lisbon Regional School District	Lisbon Regional Elementary School	Rural: Distant (42)	125	42.4%	No
		Lisbon Regional Middle School	Rural: Distant (42)	102	23.5%	Yes
		Lisbon Regional High School	Rural: Distant (42)	117	33.3%	No
	Littleton School District	Mildred C. Lakeway Elementary School	Town: Remote (33)	361	51.8%	Yes
	Milan School District	Milan Village School	Rural: Distant (42)	87	20.7%	No
	Northumberland School District	Groveton High School	Rural: Remote (43)	133	43.6%	No
		Groveton Elementary	Rural: Remote (43)	136	56.4%	No
	Profile School District	Profile Junior High School	Rural: Fringe (41)	101	31.7%	No
		Profile Senior High School	Rural: Fringe (41)	171	25.3%	No
	Stark School District	Stark Village School	Rural: Remote (43)	26	80.8%	No
	Stratford School District	Stratford Public Elementary School	Rural: Remote (43)	74	74.3%	No
		Stratford Public High School	Rural: Remote (43)	24	50.0%	No
	White Mountain Regional School District*	White Mountains Regional High School	Rural: Distant (42)	430	35.8%	Yes

[1] Information from the NHDOE [http://www.education.nh.gov (2010-11 school year)]

[2] Locale information from National Center for Education Statistics (NCES) [http://www.nces.ed.gov (obtained 6/15/2011)]

[3] Free/reduced lunch percentages from the NHDOE, and only include Grade 1 and above; this statistic is used to represent percentage of families in poverty

[4] Information from grant applications

*Denotes District In Need of Improvement (DINI)

**Denotes schools on NH's "Persistently Lowest-Achieving Schools" list, from:
http://www.education.nh.gov/instruction/integrated/documents/persistently_lowest_achieving_Schapril2011.pdf (updated 4/2011)

IV. The Evaluation

A. Scope

As mentioned in the Introduction, this report focuses on the evaluation activities and outcomes for the ARRA 21st Century Classrooms grants, Classroom Technology Mini-Grants, and TLC Program. The evaluation and reporting measures the extent to which the activities funded by Title II-D have achieved three major priorities: (a) integrating technology into curricula and instruction, (b) increasing the ability of teachers to teach, and (c) enabling students to meet challenging state academic achievement standards. From these three priorities, five main research questions were developed (see section IV.B); these questions are the foundation of the findings section of this report.

In addition, this report provides an aggregate analysis of the data collected during the grant period (Fall 2009-Spring 2011) for the three Title II-D funded activities. The primary focus for analysis for the ARRA 21st Century Classrooms grants is those classrooms receiving and implementing the new technology received from the grant (the treatment group). However, when applicable, comparisons are made to classrooms that did not receive the new technology (the control group). The findings for each data source are presented by research question and individual district-level data are also reviewed for each ARRA grant recipient in an effort to identify innovative projects that positively impacted teacher instruction and student learning, as well as those projects that could easily be replicated by others.

B. Objectives and Questions

Hezel Associates' statewide evaluation of NH's Title II-D grant program activities utilized a multi-tier approach to identify the main research questions that are the crux of this report. Following from the three major priorities identified by the NHDOE, Hezel Associates developed three evaluation objectives for assessing the effectiveness, transparency, accountability, and equity of Title II-D grant activities. These objectives are:

Objective 1. Assess the degree to which districts receiving Title II-D Ed Tech funding are integrating technology into curricula and instruction as a result of project implementation.

Objective 2. Assess the degree to which districts receiving Title II-D Ed Tech funding have increased the abilities of teachers to teach as a result of project implementation.

Objective 3. Assess the degree to which districts receiving Title II-D Ed Tech funding are enabling students to meet challenging state academic standards as a result of project implementation.

Five research questions were developed by Hezel Associates to further refine the focus of the evaluation and to meet the three main evaluation objectives. These research questions are the main focus of the findings section of this report (see section V) and are aligned to the evaluation objectives.

1. How well are school staff members turning classrooms into *technology-rich learning environments*, fully equipped with hardware, software, and rich digital resources for learning? *(Objective 1)*
2. To what degree are these settings encouraging mediating outcomes for students including interactive learning, higher-level thinking skills, and student engagement? *(Objective 3)*
3. To what degree does the provision of technology tools translate into real opportunities for students to collaborate and connect with new content? *(Objective 3)*
4. How are new technologies and resources serving students of various groups, including those with the highest need? *(Objective 3)*
5. How are grantees doing in terms of training teachers not only how to use technology but also how to translate their new skills into practice in their teaching? *(Objective 2)*

In order to measure the degree to which the three identified project priorities were met by the grant activities, both instruments developed by the NHDOE and new instruments were used. As the evaluation instruments (discussed further in section IV.C) are aligned with the research questions and designed to measure changes from pre- to post-project implementation, the evaluation team used descriptive and inferential statistics to assess project impact and success. Qualitative data collected during these same time periods were used to provide additional context for key findings, as well as provide additional topics for further inquiry.

Most of the data that were analyzed in the evaluation were quantitative. Therefore, the statistical significance of differences between pre- and post-project scores and between treatment and control groups was used as the core evaluation criterion. Statistical tests of significance provide estimates of the likelihood that observed differences between pairs of scores (either pre-/post- or treatment/control) are due to chance. This in turn allows for estimations of the confidence level one can have that the program activities have had an effect on the outcomes of interest. In addition, the use of common metrics across the programs allowed for basic comparisons to be made across the three Ed Tech grant programs.

C. Evaluation Methods

Hezel Associates' statewide evaluation of NH's ESEA Title II, Part D grant program is founded on a mixed-methods approach to answer its research questions. Hezel Associates developed both its own unique instrumentation for the evaluation and also used instrumentation that was previously developed by the NHDOE. Instruments used for the evaluation captured both qualitative and quantitative data, allowing for greater depth and breadth for interpreting key findings. Prior to the analysis of data, all questions appearing on the evaluation instruments were aligned with the five primary research questions, resulting in a matrix that outlined each research question and the corresponding data sources that would be used to answer it.

Presented below are descriptions of each instrument that was implemented during the 2009-10 and 2010-11 school years.

Evaluation Sample

The sample for this evaluation includes all teachers and students from the 19 districts that received ARRA/Title II-D grant funding, as well as the 32 districts that received TLC grants, and the 35 districts that received Classroom Technology Mini-Grants. Within the ARRA/Title II-D grant, classrooms receiving the technology (treatment classrooms) were invited to participate in the evaluation as well as classrooms that did not receive new technology (control classrooms). In some districts, control classrooms were specified by the grant recipients in their local evaluation plan. In districts where no control classrooms were identified, it was requested that the evaluation instruments be distributed to all classrooms school-wide, with those classrooms not receiving the technology serving as the control group.

Due to the earlier start date in program implementation for the TLC grants and Classroom Technology Mini-Grants (September 2009) in comparison to the ARRA/Title II-D grants (January 2010), it was decided that the evaluation instruments would not be distributed to TLC and Mini-Grant participants during the 2009-10 school year. The rationale behind this decision was that the TLC and Mini-Grant participants were halfway through their project implementation by the time the instruments were fully developed whereas the ARRA/Title II-D grant participants were in the beginning stages of implementation. To rectify this timeline difference and ensure data collection requirements were met, TLC and Mini-Grant participants received modified versions of the evaluation instruments that included a retrospective (pre/post) survey at the conclusion of their implementation (Fall 2010).

Instruments Implemented During the Evaluation

NH STaR Chart

The NH School Technology and Readiness (STaR) Chart was developed by the NHDOE to measure district technology proficiency in categories corresponding to four areas: teaching and learning; professional development; administration and support; and infrastructure for technology (see Appendix 4). A listing of all main categories and their sub-categories can be found in Table 6. The instrument was derived from the Massachusetts and Texas charts sharing the same name. Using a provided rubric, the district Technology Coordinator/Director rated the district in each of the sub-categories using a four-point scale, with one representing "Early Tech" and four representing "Advanced Tech."

Table 6. NH STaR Chart Categories

Main Category	Sub-Categories
Teaching and Learning	Impact of Technology on Teacher Role
	Patterns of Teacher Use
	Design of Instructional Setting
	Curriculum Areas
	Patterns of Student Use
Professional Development	Content of Training
	Capabilities of Educators
	Leadership and Capabilities of Building Principals and District Administrators
	Models of Professional Development
	Levels of Understanding
	Universal Access: Integration of Universal Design and Assistive Technology
Administration and Support	Vision and Planning

	Technical Support (hardware, operating system, network)
	Technology Integration Specialist
	Budget Levels
	Budget Allocated for Technology (Total Cost of Ownership)
Infrastructure for Technology	Universal Design and Accessible Technology Considerations
	Students Per Instructional Computer
	Internet Access Connectivity/Speed
	E-Learning Environments
	LAN/WAN
	Other Technologies
	Security

For ARRA grant recipients, this rubric was completed twice. Submission of this chart was required with the submission of an ARRA/Title II-D proposal (in Fall 2009) and again in Spring 2011. Districts that applied only for Mini-Grants or TLC grants were not required to submit this chart with their applications, but did complete the chart in Spring 2011.

Educator Survey

The Educator Survey (see Appendix 4) was a web-based survey that was implemented three times with ARRA grantees: Spring 2010, Fall 2010, and Spring 2011.[7] While most questions on the Educator Survey remained the same for each round of data collection to measure changes in participant responses over time, the Spring 2010 Educator Survey asked individuals to respond in reference to both the beginning of school year and end of school year. Because the evaluation start date occurred after districts received their grant funds and began planning and implementing project activities, this retrospective pre-test allowed for the collection of baseline data. Subsequent Educator Surveys asked for ARRA respondents to reflect solely on the current point in time.

ARRA/Title II-D Project Managers were informed about the Educator Survey and its role in the evaluation by email and they were responsible for distributing the information to teachers. Follow-up emails were sent by Hezel Associates and the NHDOE as needed. The analysis presented in this report only includes data from ARRA educators who completed both the Spring 2010 Educator Survey and the Spring 2011 Educator Survey. Educator Survey data from Fall 2010 is not reported in this document but was collected and provided to ARRA grantees for formative evaluation purposes. In total, the matched respondent sample for the Educator Survey consisted of 101 teachers from 14 ARRA/Title II-D sites. Of those 101 teachers, 65 were in the treatment group and 36 were in the control group.

TLC and Mini-Grant participants were asked to complete a modified version of the Educator Survey in Fall 2010. It consisted of a retrospective pre-post test and was implemented once over the duration of the grant period. TLC and Mini-Grant teachers were contacted directly by email to complete the survey, and NHDOE provided Hezel Associates with teacher contact lists which were used for this communication. Follow-up emails were sent by Hezel Associates and the NHDOE as needed. In total, 55 teachers from 31 Mini-Grant districts, and 55 teachers from 27 TLC districts completed the survey.

[7] TLC and Mini-grant participants did not complete the Educator Survey in Spring 2010 or Spring 2011.

The Educator Survey for the ARRA grantees contained 30 questions and took approximately 15 minutes to complete. Survey questions asked teachers to indicate the type(s) of technology purchased with the grant funds; its type and frequency of use by teachers and students; perceived impact technology has on student motivation/engagement; school and district support for teachers' use of instructional technology; professional development and support received; and sustainability plans for continued technology integration/training.

The Educator Survey data are a principal component in answering the key research questions. Data were analyzed to see whether (and how) teachers' use of technology in instructional settings has changed since the early stages of project implementation (Fall 2009 to Spring 2011 for ARRA; Fall 2009 to Spring 2010 for TLC/Mini-Grants), as well as differences in use or attitude between control and treatment groups.[8] In addition, ARRA grantees received their district-specific raw data three times over the grant period (with respondent identifying information removed) and a corresponding analysis file. The district-specific data file included an aggregate analysis of all survey questions presented in tabular and graphic form, to be used for formative evaluation purposes.

NH District and School Technology Surveys

The NH District and School Technology Surveys consisted of three separate web-based surveys developed by the NHDOE: the District Technology Survey and the two school technology surveys (*Technology Access* (Part 1) and *ICT Literacy and Professional Development* (Part 2)) and The surveys were administered to the ARRA grantees in Spring 2010 and to all grant recipients in Spring 2011.

The NH District Technology Survey and two NH school technology surveys (ICT Literacy and Professional Development, and Technology Access) were completed by each district and school receiving ARRA, TLC, or Mini-Grant funds. ARRA/Title II-D Project Managers were informed about the district and school technology surveys in an email facilitated by the NHDOE, with additional follow-up communications being sent by Hezel Associates and the NHDOE as needed. TLC and Mini-Grant Project Managers were contacted directly by Hezel Associates via email, with additional follow-up communications being sent by Hezel Associates and the NHDOE as needed. As these surveys asked for specific technical information, such as the technology building infrastructure, the Project Manager often forwarded the surveys to a district or school staff member that was most able to answer the survey questions. This person was often a technology director/coordinator or a school administrator. In total, 23 ARRA/Title-IID districts, 35 Mini-Grant districts, and 30 TLC districts completed the NH District Technology Survey. Thirty-nine ARRA/Title-IID school buildings, 37 Mini-Grant school buildings, and 42 TLC school buildings completed the NH School Technology Access Survey. Thirty-nine ARRA/Title-IID school buildings, 37 Mini-Grant school buildings, and 41 TLC school buildings completed the NH School ICT Literacy and Professional Development Survey.[9]

[8] Treatment and control groups were only applicable to the ARRA grant.

[9] Because the School Tech Surveys (Parts 1 and 2) asked respondents to report on building-level conditions, only one of each survey was completed for some combined junior and senior high schools when located in the same

The NH District and school technology surveys collected data on the technology infrastructure in schools and districts. The data were analyzed using descriptive statistics to summarize the amount and types of technology present in districts and schools.

NH District Technology Survey

The NH District Technology Survey (see Appendix 4) contained 36 questions in the Spring 2010 survey and 37 questions in Spring 2011. No time estimates were given for the survey. The instrument was distributed in Microsoft Word to ease data collection and the data were then entered into a web-based form. Survey questions asked about district-level Internet filtering, Internet connectivity (e.g., ISP provider, bandwidth, age and speed of connections), email solutions, IT staff members, technology maintenance and support, technology budgets, and planned technology upgrades.

NH School Technology Access Survey (Part 1)

The NH School Technology Access Survey (see Appendix 4) contained 38 questions in Spring 2010 survey and 39 questions in Spring 2011. As with the NH District Technology Survey, no time estimates were made for completion and it was anticipated that data collection would occur using the Microsoft Word version of the form, which was then entered into the web-based form. Survey questions asked about the quantities and types of computers and other technologies available in the school, software used, teacher and student access to online resources (e.g., presence of teacher and student accounts on the district/school network), and technical support available.

NH School ICT Literacy and Professional Development Survey (Part 2)

The NH ICT Literacy and Professional Development Survey (see Appendix 4) was available in the same format as the NH School Technology Access Survey. It contained 21 questions in Spring 2010 and 22 questions in Spring 2011. This survey asked about school-level processes to address and assess ICT Literacy standards, Internet safety, student use of digital files and portfolios, and staff professional development needs and participation.

Focus Group Protocols

Focus group visits to all districts receiving ARRA/Title II-D grant funds occurred between March 22 and April 2, 2010 and again between March 14 and March 18, 2011.[10] A staff member from the Hezel Associates evaluation team conducted two focus groups at each site: one with administrators (including technology directors, integrators, and coordinators) and one with teachers. This arrangement was intended to limit group size and promote full disclosure by eliminating possible hierarchical tensions. In Spring 2010, 36 focus groups were conducted with a total of 77 administrators and 145 teachers.[11] In Spring 2011, 38 focus groups were conducted

building (i.e. ARRA grant: 3 pairs; Mini-Grant: 2 pairs; TLC grant: 3 pairs); therefore, the counts for these particular surveys refer to *school buildings* (instead of schools).

[10] One site was not visited in March 2010, as it received grant funding after the focus groups had been conducted.

[11] Not all teachers in the Spring 2010 focus group were grant recipients as some site Project Managers invited non-grantee teachers to participate in the discussion as control group members.

with 68 participants in the administrator focus groups and 130 participants in the teacher focus groups.[12]

The focus groups generally lasted between 45 to 90 minutes and were facilitated by a Hezel Associates staff member using a pre-scripted protocol (see Appendix 4). The questions on the administrator and teacher protocols were nearly identical and focused on school/district culture, technology use resulting from the ARRA/Title II-D grant, factors impacting implementation, professional development, dissemination, impacts on student achievement, lessons learned, and project sustainability.

The March 2010 focus groups aimed to capture baseline data prior to districts' receipt of the ARRA/Title II-D grant funds and the March 2011 focus groups aimed to capture data at the project's conclusion. These qualitative data, along with other data captured from additional evaluation instruments, helped answer the research questions. In addition, district-specific summary reports of the March 2010 and March 2011 focus groups were provided to all grantees for formative evaluation purposes.

NH Case Study Report

The NH Case Study Report was developed by the NHDOE to gather data from grant recipients on the impact their ARRA/Title II-D project is having on the school/district, teachers, and students. The instrument collected descriptive information from participating schools and provided grant recipients an opportunity to "tell the story." The form contained 31 questions and included topics such as general project information; planning and implementation challenges; role of evaluation and known/anticipated outcomes; areas for project improvement; and dissemination of project outcomes.

The Case Study Report was completed by the ARRA/Title II-D grant Project Manager in consultation with other project participants and was implemented in Fall 2010 and Spring 2011. Districts receiving only Mini-Grants or TLC grants were required to submit the form only in Spring 2011. Nineteen ARRA/Title-IID sites, 28 Mini-Grant districts, and 28 TLC districts (as well as the 4 professional development centers) completed the Case Study Report form in Spring 2011.[13]

Walkthrough Observation Tool

The Walkthrough Observation Tool was developed by Hezel Associates to document technology integration in classrooms receiving ARRA/Title II-D grants. Information was recorded on the 25 item instrument pertaining to teaching style and strategies, technology use, technology integration, and student engagement (see Appendix 4). Each observation required approximately five minutes.

[12] On a few occasions, technology integrators and/or coordinators participated in the Spring 2011 teacher focus group. For this reason, "participant" is used when referring to the focus group count and not "teacher."
[13] For the analysis and reporting of TLC data, the NH Case Study Reports completed by the Project Managers at the professional development centers were used.

The Walkthrough Tool was implemented during the 2010-11 school year. Hezel Associates recommended that the tool be used to observe treatment teachers one time per week over the duration of the school year. Few sites, however, followed this protocol and most used the tool at a lesser frequency. The walkthrough observations occurred either announced or unannounced, and to ensure that teaching and learning was not disrupted, there were no interactions between the observer and teacher or the observer and students. The individuals who conducted the observations varied by school; the schools took a peer approach and utilized coaches, team teachers, and principals to increase their school's capacity for this activity, per the NHDOE's recommendation. As the Walkthrough Observation Tool may have contained terms that were new and/or unfamiliar to the observer, a technical document was created to support the tool and to give guidance on all terms appearing in the walkthrough instrument. Districts that received only Mini-Grants or TLC grants were not required to implement the Walkthrough Observation Tool due to the projects being completed by Fall 2010.

The Walkthrough Tool data presented in this report only includes those teachers who had a minimum of two observations over the duration of ARRA/Title II-D project implementation. Of that teacher group, only the first observation and last observation were included in the analysis for the purpose of documenting change over time.

Student Survey for Grades 4-12

The Student Survey for Grades 4-12 was developed by Hezel Associates and was distributed to schools receiving ARRA 21st Century Classroom grants in Fall 2010 and Spring 2011. The questions appearing on the Student Survey remained the same for both rounds of data collection to allow for the assessment of changes in student responses over time. The survey was available in both web-based and hard copy formats and existed in two versions: one for students in the treatment group and another version for students in the control group. The questions appearing on both surveys were the same to easily compare and contrast survey responses by treatment/control groups. Hezel Associates emailed the student survey to ARRA Project Managers who distributed the survey to treatment and control group teachers who then distributed the survey to their students.

The Student Survey contained a total of 19 questions and was estimated to require approximately 15 to 20 minutes to complete (see Appendix 4). Students in Grades 7-12 were asked to complete all survey questions, while students in Grades 4-6 were given only a subset of survey questions (questions 1-14). Because research suggests that survey data collected from children in grades three and below generally do not meet the quality threshold required for statistical analysis, students in grade three and below were not surveyed.[14]

The Student Survey contained questions about students' technology use inside and outside of school, the types of technologies they use, locations of their use, frequencies of use, and the amount of assistance needed. In addition, attitudinal questions measuring the impact of technology on areas such as student engagement and motivation were included. In total, the matched student sample (students who completed the survey in Fall 2010 and Spring 2011)

[14] Borgers, N., de Leeuw, E., & Hox, J. (2000, April). Children as respondents in survey research: Cognitive development and Response quality. *Bulletin de Methodologie Sociologique*, *66*, 60-75.

consisted of 1417 students from 17 ARRA/Title II-D sites. Of those 1417 students, 1030 were in the treatment group and 387 were in the control group.

The evaluation matrix is presented below (see Table 7).

Table 7. Evaluation Matrix

Key Research Question	Data Sources	Data Collection Methods/ Instruments[1]	Performance Indicators/Success Standards[2]	Methods for Data Analysis
RQ 1	Educator Survey	Surveyed participating educators (ARRA: S10, F10, S11; Mini-Grant and TLC: F10)	Increase in tech. availability; Increased % of teachers using tech. with students; Increase in the *types* of tech. being used; Improved comfort level with tech.; Improved perceived value of classroom tech.	• Descriptive statistics/ Frequencies • Open-ended coding • Crosstabulations on demographic/ key variables • Measurement of outcomes across data points; • Inferential statistics to find statistically significant changes
	NH District Technology Survey	Surveyed participating ARRA technology director/ coordinator (ARRA: S10, S11; Mini-Grant and TLC: S11)	Increased quantity, range and quality of tech. provisions in relation to budgetary and support measures	
	NH School Technology Access Survey	Surveyed participating technology director/ coordinator (ARRA: S10, S11; Mini-Grant and TLC: S11)	Increased quantity, range and quality of tech. provisions in relation to budgetary and support measures	
	NH School ICT Literacy and Professional Development Survey	Surveyed participating technology director/ coordinator (ARRA: S10, S11; Mini-Grant and TLC: S11)	Increases in staff dedicated to ICT initiatives; Increased capacity to incorporate ICT instruction across grades; Increased breadth of internet safety instruction across grades	
	Administrator/Teacher Focus Groups*	Focus group discussions with participating administrators/educators (ARRA: S10, S11)	Increased reports of successful tech. implementation; solutions to challenges; detailed tech. and collaboration plans; improved comfort with tech; detailed sustainability plan	
	NH Case Study Report	Surveyed participating project manager (ARRA: F10, S11; Mini-Grant and TLC: S11)	Increased teacher involvement; reported solutions to planning and implementation challenges; increased breadth of project priorities	
	NH Student Survey*	Surveyed participating students (ARRA: F10, S11)	Increased frequency of student tech. use; Increased frequency in *types* of technology used by students; Indicators for dynamic contexts in which students interact with technology; Student gains in confidence to navigate the resources and fix problems	

Key Research Question	Data Sources	Data Collection Methods/ Instruments[1]	Performance Indicators/Success Standards[2]	Methods for Data Analysis
	NH STaR Chart	Completed by participating district or school technology coordinator/ director (ARRA: F09, S11; Mini-Grant and TLC: S11)	Growing/high levels of perceived web access, quality of connectivity, and security provisions; Growing/high levels of perceived support for tech. functionality and integration; Growing/high levels of perceived student & teacher access to various hardware/software solutions; Growing/high levels of perceived capacity, utility and thoughtfulness of instructional settings designed around technology; Growing/high levels of perceived teacher capacity for making curricular connections and providing constructivist learning opportunities for students	
	Walkthrough Observation Tool*	Observations of participating ARRA educators (completed by peer coach, team teachers, principal, or other) (weekly during 2010-11 academic year)	Adequately and thoughtfully equipped learning environments; Observed technology use by students, teachers and other key personnel in dynamic learning contexts; Fluid navigation of resources and few technical issues (or clearly informed trouble-shooting); Opportunities for student-led/collaborative exploration of resources	
RQ 2	Educator Survey	Surveyed participating educators (ARRA: S10, F10, S11; Mini-Grant and TLC: F10)	Increase in frequency and complexity of student learning using tech.	
	NH School ICT Literacy and Professional Development Survey	Surveyed participating technology director/ coordinator (ARRA: S10, S11; Mini-Grant and TLC: S11)	Increase in number of 8th graders that meet the ICT competency requirements; other noted improvements in assessing ICT skills	
	Administrator/Teacher Focus Groups*	Focus group discussions with participating administrators/educators (ARRA: S10, S11)	Increased reports of perceived and observed student impact, and of improved commitment to student achievement via tech. use	
	NH Case Study Report	Surveyed participating project manager (ARRA: F10, S11; Mini-Grant and TLC: S11)	Reports of improved student impact and gains in achievement	
	NH Student Survey*	Surveyed participating students (ARRA: F10, S11)	Improved student perceptions of technology's capacity for making learning/school enjoyable, helping with school work, and initiating	

Key Research Question	Data Sources	Data Collection Methods/ Instruments[1]	Performance Indicators/Success Standards[2]	Methods for Data Analysis
			other benefits/opportunities; Indicators of ICT-enabled classroom opportunities for higher-order thinking and 21st Century skill-building	
	NH STaR Chart	Completed by participating district or school technology coordinator/ director (ARRA: F09, S11; Mini-Grant and TLC: S11)	Growing/high levels of perceived ICT literacy skills among students	
	Walkthrough Observation Tool*	Observations of participating ARRA educators (completed by peer coach, team teachers, principal, or other) (weekly during 2010-11 academic year)	Presence of tech-enabled student activities that address advanced cognitive skills and 21st Century ICT standards; High levels of student motivation and engagement	
RQ 3	Educator Survey	Surveyed participating educators (ARRA: S10, F10, S11; Mini-Grant and TLC: F10)	Increased opportunities for collaboration and constructivist learning using tech.	
	NH School ICT Literacy and Professional Development Survey	Surveyed participating technology director/ coordinator (ARRA: S10, S11; Mini-Grant and TLC: S11)	Increase in number of 8th graders that meet the *communication & collaboration* component of ICT literacy standards	
	Administrator/Teacher Focus Groups*	Focus group discussions with participating administrators/educators (ARRA: S10, S11)	Increased reports of using tech. to provide opportunities for collaboration and constructivist learning	
	NH Case Study Report	Surveyed participating project manager (ARRA: F10, S11; Mini-Grant and TLC: S11)	Increased emphasis on/observations of community and collaboration among student tech. use	
	NH Student Survey*	Surveyed participating ARRA students (ARRA: F10, S11)	Indicators of ICT-enabled classroom opportunities for constructivist/collaborative knowledge construction	
	NH STaR Chart	Completed by participating district or school technology	Growing/extensive opportunities for student-centered learning	

Key Research Question	Data Sources	Data Collection Methods/ Instruments[1]	Performance Indicators/Success Standards[2]	Methods for Data Analysis
		coordinator/ director (ARRA: F09, S11; Mini-Grant and TLC: S11)		
	Walkthrough Observation Tool*	Observations of participating ARRA educators (completed by peer coach, team teachers, principal, or other) (weekly during 2010-11 academic year)	Presence of constructivist/collaborative opportunities in tech-enabled student activities	
RQ 4	Educator Survey	Surveyed participating educators (ARRA: S10, F10, S11; Mini-Grant and TLC: F10)	Increased capacity to personalize learning activities; Evidence of closing gap between SINIs and non-SINIs in areas of tech. availability, use, and personalization of learning activities	
	Administrator/Teacher Focus Groups*	Focus group discussions with participating administrators/educators (ARRA: S10, S11)	Increased reports of using tech. to differentiate and personalize learning among SINI and non-SINI groups	
	NH Case Study Report	Surveyed participating project manager (ARRA: F10, S11; Mini-Grant and TLC: S11)	Increased reports of emphasizing tech. literacy for *all* students; Reports of improved/successful approaches for differentiating and personalizing learning among SINIs and non-SINIs	
	NH Student Survey*	Surveyed participating students (ARRA: F10, S11)	Reported opportunities for personalizing resources and learning tools; Evidence of closing gap among SINI and non-SINI students in areas of tech. availability, use, proficiency, and perceived value	
RQ 5	Educator Survey	Surveyed participating educators (ARRA: S10, F10, S11; Mini-Grant and TLC: F10)	Improvements in perceived efficacy of professional development; Increased frequency of professional development activities	
	NH School ICT Literacy and Professional Development Survey	Surveyed participating technology director/ coordinator (ARRA: S10, S11; Mini-Grant and TLC: S11)	Increased % of staff participating in professional development activities; Improved availability for/access to professional development	
	Administrator/Teacher Focus Groups*	Focus group discussions with participating administrators/educators	Improved frequency of/satisfaction with training	

Key Research Question	Data Sources	Data Collection Methods/ Instruments[1]	Performance Indicators/Success Standards[2]	Methods for Data Analysis
		(ARRA: S10, S11)		
	NH Case Study Report	Surveyed participating project manager (ARRA: F10, S11; Mini-Grant and TLC: S11)	Increased priority and breadth of professional development	
	NH STaR Chart	Completed by participating district or school technology coordinator/ director (ARRA: F09, S11; Mini-Grant and TLC: S11)	Growing/high capacity of training to address meaningful and sustainable ICT integration and enhance the tech. competencies of educators/personnel; Establishment of PD models that create a culture of ongoing inquiry and collective capacity-building learning via a variety of conduits	

[1]S=Spring; F=Fall

[2] Performance indicators/success standards for Mini-Grant and TLC recipients may not exhibit *increases* or *improvements*, as many data were collected at just one point in time; therefore, success was often determined by high frequencies of survey response items (e.g. % of respondents strongly agreeing to a question) or respondents' positive reflections.

*Indicates this item is not applicable to Mini-Grant or TLC recipients.

Limitations

There are several known limitations that impacted data collection and analysis for the ARRA grant evaluation. First, data were not collected from all teachers and students who received technology as part of the grant. In the Educator Survey, teachers were asked to identify themselves as (a) a participant in the ARRA/Title II-D grant and (b) a treatment or control teacher within the grant. However, some teachers were unsure of how to answer these questions. As these questions were the only available means for identifying treatment teachers, the Educator Survey sample was not as large as the known number of treatment teachers. Furthermore, some teachers selected "I don't know" or did not respond to some of these questions. Their identities could not be traced to the participating schools due to anonymity guaranteed to the respondents and therefore, these respondents had to be removed from the analysis. Lack of knowledge on the part of some ARRA teachers also impacted the implementation of the Student Survey. Teachers were asked to provide their students with the appropriate version (treatment or control) of the survey and some cases arose where teachers used one form in the pre-test and a different form in the post-test.

Second, as ARRA grant implementation was not conducted in a controlled environment, it is possible that control group teachers and students gained access to certain technologies as the year progressed. In some focus group discussions, teachers mentioned sharing equipment with non-grant teachers. Other school and district representatives mentioned receiving funds through other grants that were used to purchase additional technologies for other teachers and students. Some focus group participants indicated that professional development – not necessarily tied to ARRA/Title II-D funding – was provided to all teachers in the school or district. All of these factors could lead to increases in control group teachers' comfort when using technology, actual use of technology, or certain perceptions of impact on students. As a result, the impact of the ARRA/Title II-D grant may be underestimated in this evaluation when comparisons are made between treatment and control groups.

Third, ARRA grantee teachers and students were asked to complete the final round of evaluation data collection near the end of the 2010-11 school year. While a very small amount of time remained from the end of data collection activities to the end of the school year, it is possible that some schools conducted additional professional development after evaluation data had already been submitted.

Fourth, some ARRA grantee schools experienced staff turnover (project managers, grantee teachers, or administrators), which often caused disruptions or stalled project implementation. As a result, the effects of the projects might be underestimated, as the actual length of time and extent of implementation in these schools may be smaller than in other schools in the analysis.

Fifth, several evaluation instruments which asked for data at the school- or district-level did not specify that the data should only refer to those classrooms receiving ARRA grant technology (i.e. treatment data). As a result, any changes that occurred from ARRA pre-implementation to post-implementation on these instruments may be due to impacts from other initiatives that were occurring school- or district-wide at the same time.

Finally, while it was recommended that the Walkthrough Observation Tool be implemented weekly (throughout the school year) for each ARRA treatment teacher, very few schools implemented the tool at this frequency. As a result, data analysis options were limited and the analysis presented in this report only includes those teachers who were observed at a minimum of two times over the course of the school year.

The Mini-Grant and TLC grant projects had a different data collection strategy and therefore a different set of limitations. Some evaluation data (e.g., district and school technology surveys) for these grant types were collected at one point in time (after the conclusion of the grants) and lack a baseline comparison. Similarly, both the Mini-Grant and TLC grant evaluations did not include a control group, so observed changes in teacher and student practices cannot be definitively attributed to the Mini-Grant or TLC grant.

V. Results

This section provides an aggregate analysis of the data collected during the 2009-10 and 2010-11 school years for Title II-D grants. For the ARRA grant, the primary focus is on those classrooms receiving and implementing the new technology received from the grant (the treatment group), though comparisons to classrooms that did not receive the technology (control group) are made when applicable. Presented below are the rates of return for each instrument and grant type (Table 8). The Rates of Return table does not include matched sample numbers (e.g., the final number of those who completed a Student Survey in both the beginning and end of the year); for specific numbers regarding matched samples, see Section IV.C. In an effort to discuss innovative projects that positively impacted teacher instruction and student learning, some individual site-level data were reviewed (see section V.B for the discussion of exemplary sites).

Table 8. Rates of Return

Instrument	Timeframe[1]	ARRA	Mini-Grants	TLC
NH STaR Charts	F09	100.0% (19 of 19 sites)	-----	-----
	S11	100.0% (19 of 19 sites)	97.1% (34 of 35 districts)	100.0% (32 of 32 districts)
Case Study Report	F10	94.7% (18 out of 19 sites)	-----	-----
	S11	100.0% (19 out of 19 sites)	80.0% (28 of 35 districts)	87.5% (28 of 32 districts; also, 4 of 4 PD centers)
Focus Groups	S10	94.7% (18 of 19 sites)	-----	-----
	S11	100.0% (19 of 19 sites)	-----	-----
District Tech Survey	S10	100.0% (23 of 23 districts)	-----	-----
	S11	100.0% (23 of 23 districts)	100.0% (35 of 35 districts)	93.8% (30 of 32 districts)
School Tech Survey Part 1 – Access[2]	S10	100.0% (39 of 39 school buildings)	-----	-----
	S11	100.0% (39 of 39 school buildings)	94.9% (37 of 39 school buildings)	95.5% (42 of 44 school buildings)
School Tech Survey Part 2 – ICT & PD[2]	S10	100.0% (39 of 39 schools)	-----	-----
	S11	100.0% (39 of 39 school buildings)	94.9% (37 of 39 school buildings)	93.2% (41 of 44 school buildings)
Educator Survey	S10	37.4% (85 of 227 educators)	-----	-----
	F10	33.9% (77 of 227 educators)	64.7% (55 of 85 educators)	76.4% (55 of 72 educators)
	S11	32.2% (73 of 227 educators)	-----	-----
Classroom Walkthrough Tool	2010-11	90.5% (38 of 42 schools; 742 entries)	-----	-----
Student Survey	F10	20.2% (1557 treatment of 7720 total students)	-----	-----
	S11	15.8% (1221 treatment of 7720 total)	-----	-----

[1] S=Spring; F=Fall; Classroom Walkthrough Tool was recommended to be implemented weekly throughout 2010-11

[2] Because the School Tech Surveys (Parts 1 and 2) asked respondents to report on building-level conditions, only one of each survey was completed for some combined junior and senior high schools when located in the same building (i.e. ARRA grant: 3 pairs; Mini-Grant: 2 pairs; TLC grant: 3 pairs); therefore, the counts for these particular surveys refer to *school buildings* (instead of schools).

Data Analysis

The quantitative data from the surveys, Walkthrough Tool, and NH STaR Chart were analyzed using descriptive statistics, including frequencies and crosstabulations, for a more in-depth understanding of implementation from the perspective of educators and administrators. Where appropriate, data were analyzed using inferential statistics (e.g., *t*-tests) to compare means. Data from the focus groups were transcribed non-verbatim, though key quotes from individuals were manually recorded. Qualitative analysis of open-ended survey questions and focus group summaries and quotes were performed by coding and grouping responses into commonly occurring themes. Data from the Case Study Report was used to supplement and verify information received from the aforementioned evaluation instruments. Evaluators relied on multiple data checks throughout the analysis and reporting process to ensure data accuracy, including follow-up communications with project participants regarding all unclear data.

The findings below are organized by grant type and then by research question. Unless otherwise indicated, the findings presented are from the final data collection point, and agreement (*Strongly Agree* to *Strongly Disagree*) questions report percentages of respondents "agreeing" (includes a combined response of choices for *Strongly Agree* and *Agree*). Also, data represent treatment group perceptions for the ARRA/Title II-D grants unless otherwise noted.

A. ARRA 21st Century Classrooms Grant

1. Findings By Research Question

RQ1: How well are school staff members turning classrooms into technology-rich learning environments, fully equipped with hardware, software, and rich digital resources for learning?

Participating schools and districts reported varied resources and provisions that improved their access to and awareness of technology-enabled instructional practices. Generally, their infrastructures were sufficiently sound for incorporating most of the new tools and districts are establishing support personnel and solutions to address their ongoing maintenance needs. However, they could use additional support and more regular availability for curricular integration efforts. These resources have served as a conduit for a number of pedagogical strategies, and educators found themselves using the technology with students to a greater extent as the year progressed. Teachers also reported increased confidence in their own technology use and in the potential for technology to improve student learning. While delays in deployment and other implementation challenges (e.g., connectivity and compatibility issues) generated some setbacks, participants – both teachers and administrators – generally have a positive outlook on technology's instructional effectiveness. All of these factors are contributing to a culture of collaboration and awareness around technology-enabled teaching and learning.

District-Level Technology Support and Infrastructure

Technical Access at the District Level

ARRA grant recipients completed the NH District Technology Survey twice, the first time in the Spring 2010 and for a second time in Spring 2011. Evident by responses provided on the NH

District Technology surveys, there were various technical provisions, solutions, and infrastructure capabilities used across the ARRA districts.

Districts most frequently reported the use of *Comcast* (30.4%) and *Metrocast* (21.7%) for Internet service providers, and several districts reported the use of more than one Internet service provider. All districts purchased bandwidth, and as of Spring 2011, nearly three quarters of districts (73.9%) indicated the use of full T1, ATM, or greater. As this is an increase of 17.4% from Spring 2010, it may indicate that some ARRA grantees obtained additional bandwidth to support the influx of technologies from the grant. Districts on average rated their level of Internet access connectivity/speed highly at the end of the grant period (*M*=3.11 out of 4) using the NH STaR Chart. Similarly, districts indicated high levels (*M*=2.99 out of 4) in LAN/WAN network and wireless connectivity post-implementation.

ARRA districts' use of Internet filters and time spent maintaining filters remained nearly unchanged from Spring 2010 to Spring 2011, with *Sonic Wall* as the most cited (30.4% in Spring 2011). Sixty-five percent of districts spent less than five hours per month and 34.8 percent of districts spent five to eight hours per month on filter maintenance and block/unblock requests. Three quarters (73.9%) of the districts kept their filtering log files for 30 days or less. On average, districts had generally high levels of security protection (*M*=3.13 out of 4), according to administrators' ratings on the NH STaR Chart.

Over half of participating districts relied on either *Sagebrush Spectrum* (36.4%) or *Follett* (36.4%) for their library automation systems. While all but one district used library automation systems, few districts used curriculum-mapping software (73.9% percent of districts did not use curriculum-mapping software in Spring 2011).

Sixty-five percent of districts reported they expect teachers to use their school or district email addresses as a primary school communication tool, though they did not have a policy that requires this. Districts used a wide variety of email solutions, with *MS Outlook* the most common. In Spring 2011, districts reported spending less time per month on email maintenance than they had in the previous year, as 91.3 percent of districts spent 0-8 hours per month on email maintenance in Spring 2011, compared to 73.9 percent in Spring 2010.

Support to handle district-level hardware and software maintenance did not change over the past year. In order to handle hardware maintenance, 77.8 percent of districts employed a full time district level tech-coordinator and fifty percent of districts paid an IT company or individual for support services. Support provided to handle software maintenance was similar to the support provided to handle hardware maintenance—63.6 percent of districts had a full time district-level technology staff position and 27.3 percent of districts hired an outside IT company for software maintenance. Finally, 52.2 percent of districts had a full time district staff member who provided 21st century learning support. Twenty six percent of the districts paid an IT company or individual for support and 17.4 percent paid/sponsored a local education support center.[15] On average, districts indicated their technical support and the type of technology integration

[15] Districts could select more than one response for all items discussed in this paragraph.

specialist provided were still at *developing* levels at the end of the grant period (*M*=2.39 and 2.18 post, respectively; out of a possible 4).

Table 9 shows that the average budget allocated to district technology spending (hardware, software, connectivity, and support) increased between 2009-10 and 2010-11. However, the budgets for the upcoming year do not show the same amount of growth. Also, districts rated their budget levels (*M*=2.45out of 4) and allocation of funds per student (*M*=2.00 out of 4) as *developing* on the NH STaR Chart.

Table 9. Locally budgeted amounts for district technology (District Tech Survey)

School year	N (districts)	Min	Max	Mean
2009-10	22	$10,000	$1,467,047	$378,144
2010-11	22	$10,000	$1,784,804	$401,415
2011-12	20	$10,000	$1,730,804	$405,335

Perceptions of Grant Provisions at the District Level

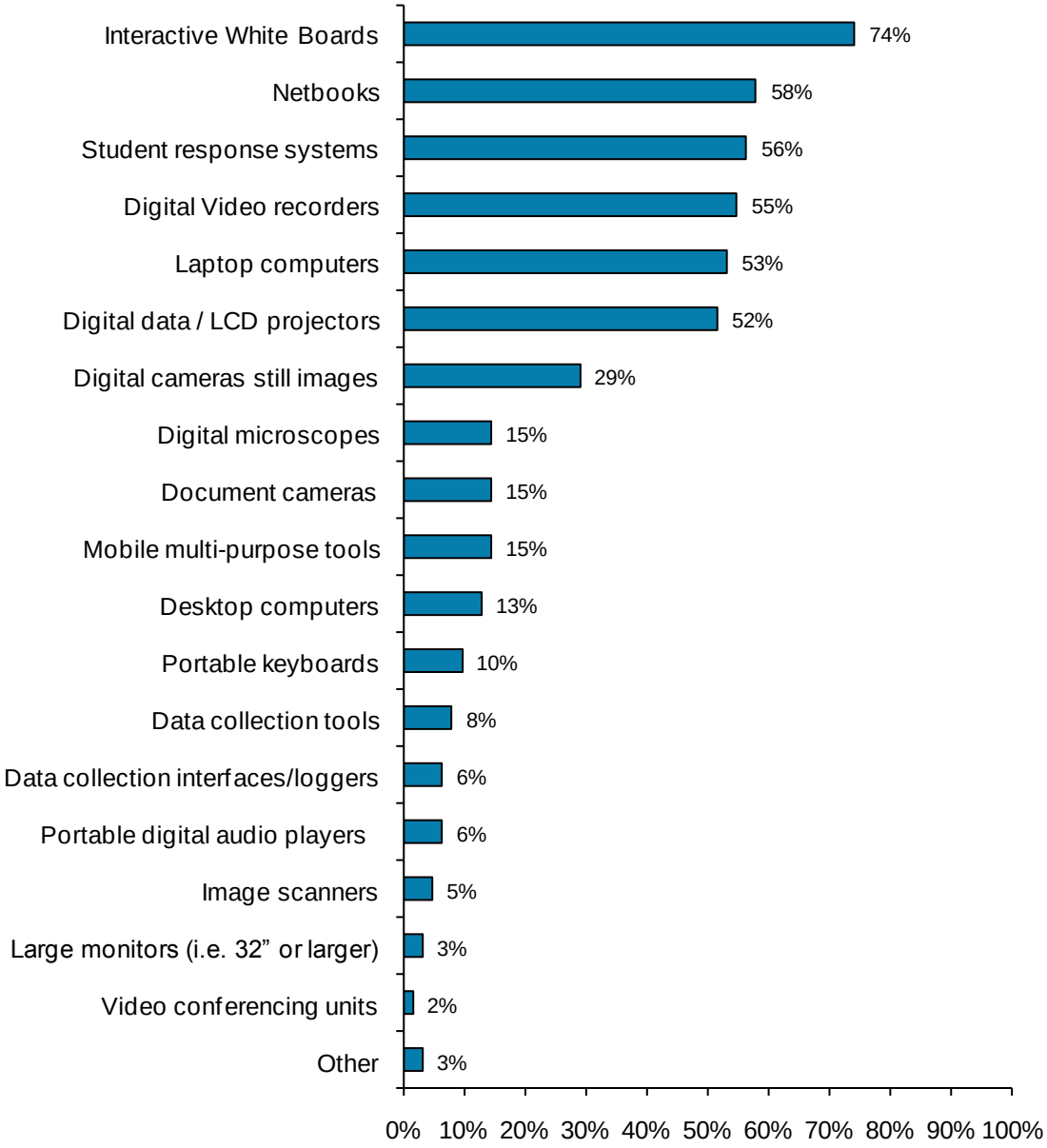
ARRA sites had varying levels of technology access (and use) for teachers prior to the grant. Focus groups in Spring 2010 revealed that while some teachers had the technology equipment they needed, others had to borrow from or share with other teachers. The types of tools varied (e.g., interactive whiteboards, digital cameras), as did their condition. While some teachers still reported the need to share equipment in the Spring 2011 focus groups, nearly all sites now have more technology than before the grant. Over half of the ARRA sites stated in the Spring 2011 focus groups that the increased amount of – and access to – technology greatly facilitated the implementation of their individual projects.

By the end of the ARRA grant, 71.0 percent of treatment teachers indicated they had received all of the technology that the ARRA grant funded; however, 27.4 percent indicated they had only received *some* of the technology, and one individual reported not receiving any of the technology. Two-thirds of the teachers began using the technology at the end of the 2009-10 school year (67.3%), while the remaining teachers began implementation in Fall 2010 (32.8%). This was also confirmed through focus groups conducted at the ARRA/Title II-D sites, as administrators and teachers revealed that variation existed regarding timing of receipt of the grant funds, which impacted the purchase and implementation of technology.

Over 80 percent of teachers (81.7%) had access to the technology for the entire ARRA grant as the technology stayed in their classroom. The remainder of the teachers (18.3%) indicated that they had access to the technology for only a portion of the grant as the technology rotated between classrooms.

The types of technology purchased with grant funds to meet project needs predominantly included interactive white boards, followed by netbooks and student response systems (see Figure 1).

Figure 1. Technology hardware purchased with ARRA funds for classroom use as reported by educators in Spring 2011 (treatment; n=62)



Note: the graph above represents the percentage of educators who reported that their school/district purchased the technology hardware listed for use in their classroom. For example, 74 percent of educators reported that their district/school purchased interactive whiteboards with ARRA grant funds for use in their classroom.

School-Level Support and Infrastructure

The NH School Technology Access Survey was completed at 39 school buildings, typically by tech directors/coordinators and other specialists, but occasionally by principals or other school-level officials.[16] As at the district level, school technology provisions varied considerably.

Schools typically had more PCs than Mac equipment, in both Spring 2010 and Spring 2011. While over half of schools reported having no Macs (52.5%, Spring 2011), the schools with Macs most frequently reported having (71.4%) less than 50 Macs. By comparison, all responding schools had PCs, and half (50.0%) reported PC counts in the hundreds. Several schools also had considerable numbers of thin client and netbook computers, with 66.7 percent of responding schools having over 50 thin clients or netbooks. Districts also reported that they are, on average, at a *developing* level in their number of students per instructional computer using the NH STaR Chart. A statistically significant increase was seen from pre (M=2.11out of 4) to post (M=2.63 out of 4) in this rating,[17] indicating that districts are steadily moving towards being *proficient* in this category.

In both Spring 2010 and Spring 2011, all schools had fewer than 10 mobile computer labs, with 12.8 percent of schools having no mobile computer labs. The mobile labs were typically shared among several classrooms. Less than half (45.5%) of the schools with mobile labs shared these labs among 20 or more classrooms in Spring 2011, which is a notable decrease from 56.3 percent of schools that shared the labs with 20 or more classrooms in Spring 2010. At the end of the grant period, 72.4 percent of surveyed teachers reported that computer labs were generally available when needed for their students. On average, administrators using the NH STaR Chart rated the design of the instructional setting as *developing* (M=2.58 out of 4 post), indicating that instructional settings are primarily labs, libraries, and many classrooms, all with flexible scheduling. The change from pre (M=2.00 out of 4) to post (M=2.58 out of 4) was statistically significant,[18] indicating that districts are headed towards *proficient* levels.

Most schools provided at least some of their teachers with computers. Specifically, half of the schools provided 15 or more teachers with desktop computers (while 20.6% provided no teachers with desktop computers), and 62.2 percent provide 15 or more teachers with laptops.

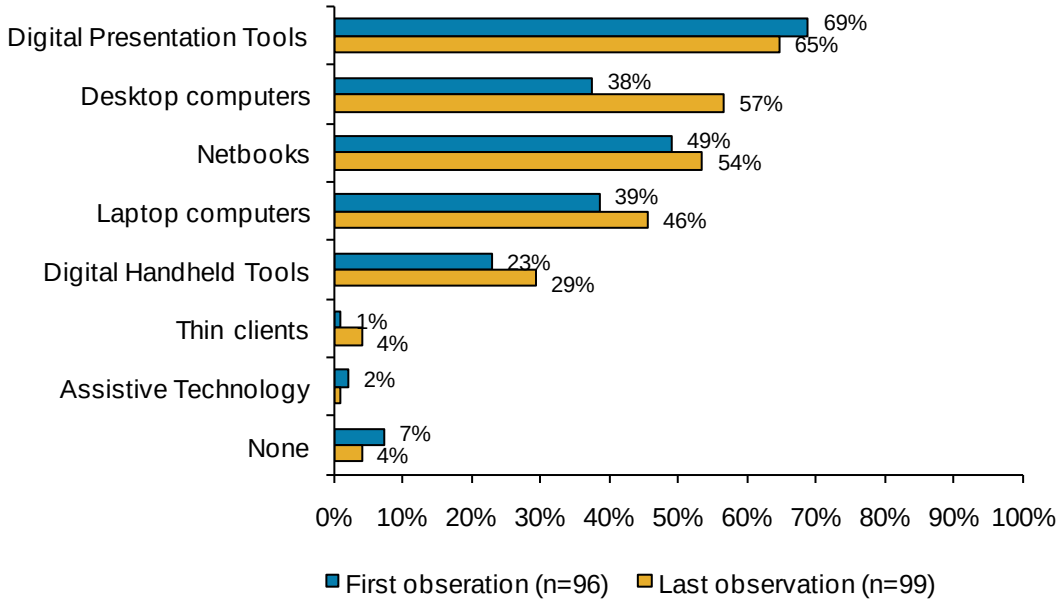
Several kinds of digital presentation tools were available in schools. All but one building reported having digital/LCD projectors, and over half (51.3%) have 15 or more per building. The majority (81.0%) of schools reported having at least one classroom wired for cable television, and all but one school reported having at least one interactive whiteboard (with *PolyVision* and *Smart Board* as the most frequently reported brands). Among digital handheld devices available, all schools reported access to digital cameras, and nearly all (92.1%) reported having digital video cameras and image scanners (89.2%). Several other schools reported access to student response systems/clickers (91.9%), graphing calculators (57.1%), portable keyboards (50.0%), and MP3 players or similar devices (41.2%). On average, districts reported a moderate

[16] Because survey asked respondents to report on building-level conditions, only one survey was completed for two pairs of schools (the buildings were combined junior/senior high schools).
[17] t (18) = 3.39, p<.005 (two-tailed), paired samples
[18] t (18) = 4.01, p<.001 (two-tailed), paired samples

amount of shared use of technology resources (*M*=2.84 out of 4), according to their ratings on the NH STaR Chart.

Data from the Walkthrough Observation tool showed a significant increase in the number of devices in the room from the early part of the ARRA grant (*M*=12.1 first observation) to the end of the grant (*M*=14.6 last observation);[19] however, walkthrough observation data also showed minimal increases in hardware access from the first to last observation. The largest change was in access to desktop computers (a 19.1% increase) whereas other mobile technologies (e.g., laptop computers, netbooks) showed minimal change (see Figure 2).

Figure 2. Classroom hardware access from the Walkthrough Observation Tool (treatment)



Most administrators (89.7%) indicated that teachers had accounts set up on the network, and 92.3 percent of schools reported that teachers had email accounts provided to them. Ninety-seven percent of schools reported that teachers have the ability to access their accounts outside of the school network (e.g. while at home). A smaller percentage of schools (38.5%) permitted teachers to access their school files outside of school, and only a quarter of schools (25.6%) had a policy or expectation for teachers to maintain a class website for communications with parents and students.

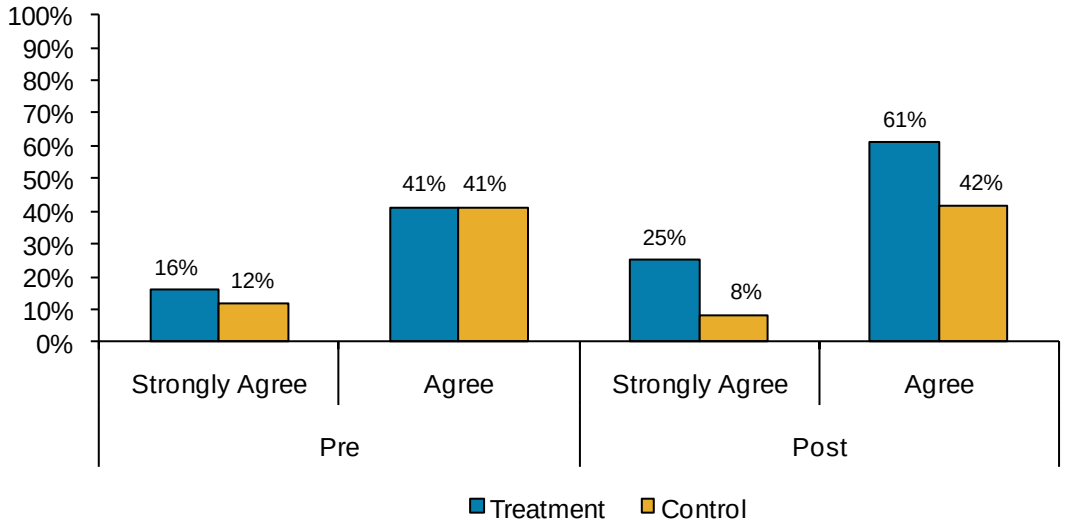
Teachers in the treatment group were more likely to report that their schools' technology functioned properly and more after the grant than before the grant (84.6% post, 72.3% pre), though control teachers also reported an increase in the same measure (80.5% post, 67.7% pre). Also, teacher observation data indicated that there were very few technical problems observed

[19] t (77) = 2.35, p<.05 (two-tailed), paired samples

throughout the grant period (11.1% last observation, 9.4% first observation). This is also confirmed through focus groups and project managers' responses using the NH Case Study Report, as several sites indicated experiencing infrastructure issues prior to or at the start of the grant. As a recommendation, one project manager wrote in the NH Case Study Report, "Make sure all infrastructure issues are addressed BEFORE introducing new technology to the building."

Furthermore, educators increasingly reported that they received sufficient support for successfully using technology with their students (85.9% post, 57.2% pre). In contrast, only 50.0 percent of control group teachers were satisfied with this support post-implementation (see Figure 3). Likewise, ARRA teachers' perception of curriculum support for integrating technology with their students increased by 27.7 percent over the course of the grant (87.7% post, 60.0% pre). By comparison, control teachers reported a smaller increase of 12.6 percent (54.3% post, 41.7% pre).

Figure 3. I receive enough technical support to be successful in using technology with students (selected *Strongly Agree* or *Agree*)*



*The number of respondents ranged from 63-64 for the treatment group and 34-36 for the control group due to missing data.

However, many grantees indicated that technical support was both a facilitator and barrier to project implementation. Some sites also emphasized the need for on-site technical support, and one teacher indicated that technical staff are "overwhelmed and overworked." Similarly, an administrator remarked that the need for technical support is "always underestimated." One teacher also stressed the importance of technical support and stated, "You want the teachers to be focusing on their teaching the curriculum, and you don't want them wondering 'If I press this button, will this thing actually work?'"

Administrators were asked to report on the way hardware maintenance, software support, and curriculum integration was handled at the school level. In general, hardware maintenance was provided predominantly by paid full-time (61.3%) or part-time staff (29.0%) in Spring 2011. The percentage of full-time staff increased and part-time staff decreased from the Spring 2010

percentages (50.0% and 40.0%, respectively). Software support was also generally provided by full-time (56.3% in Spring 2011; 44.1% in Spring 2010) or part-time staff (31.3% in Spring 2011; 35.3% in Spring 2010), though some support was provided by school staff who were reimbursed with stipends for their services (21.9% in Spring 2011; 32.4% in Spring 2010) or from staff and/or students without specific compensation (28.1% in Spring 2011; 11.8% in Spring 2010). Support for curriculum integration was primarily by full-time staff (46.9%), and to a much lesser extent staff members who received a stipend (25.0%) or part-time staff (21.9%); however, in Spring 2010, support was more evenly provided between full-time and part-time staff for curriculum integration (42.3% each).

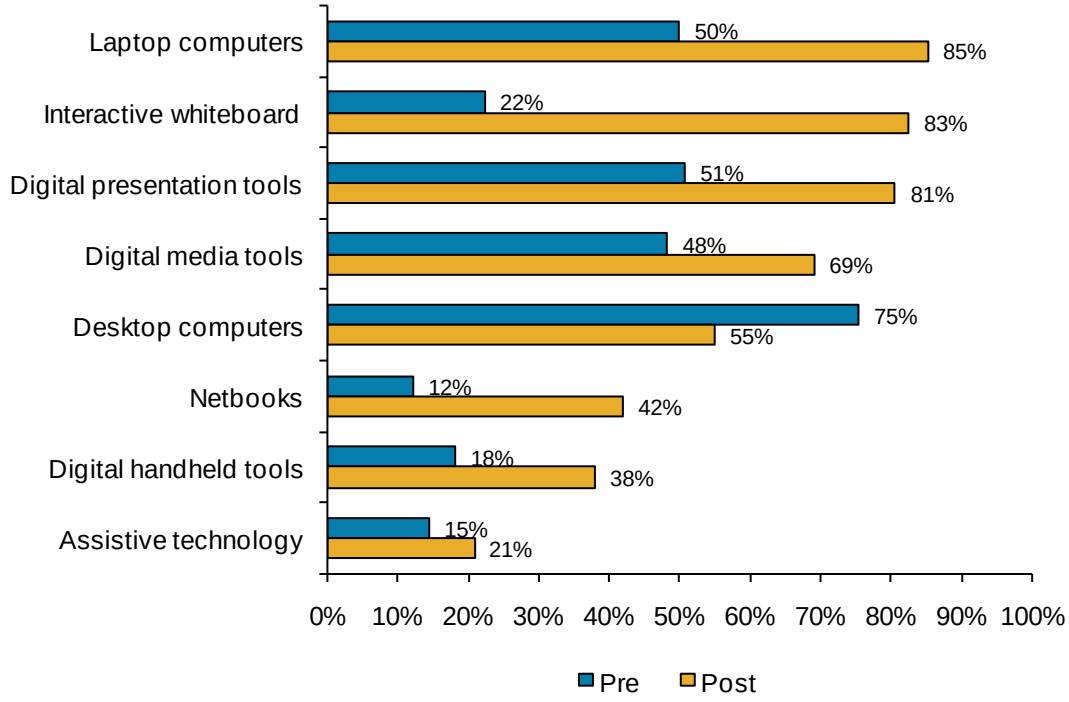
Teacher Practice

Just under half of treatment teachers (43.1% post) indicated that they devote more than half of their class time to student technology use, which was a slight decrease from 51.0 percent who planned to do so pre-implementation. While there was a substantial increase of 39.8 percent in educators who used technology in their instruction with students every day (61.3% post; 21.5% pre), a similar increase was seen for the control group (62.9% post; 15.2% pre).

Just over half of the educators in the treatment group reported implementing a one-to-one intervention with regular individual student access to the technology, while the other half of the teachers were either not incorporating the resources in this way (35.5%) or indicated that they did not know (9.7%).

At the conclusion of the ARRA grant, laptops, interactive whiteboards and digital presentation tools were most used by teachers. While all technologies except for desktops increased (which is contradictory to observation data, which reported increased use of desktop computers), use of interactive whiteboards increased drastically by 60.1 percent. When comparing instructional tools by group type (treatment and control), the treatment teachers increased more in their use of interactive whiteboards and netbooks, while control group teachers increased more in their use of assistive technologies (see Figure 4 below, and Figure 77 in Appendix 6 for control group percentages).

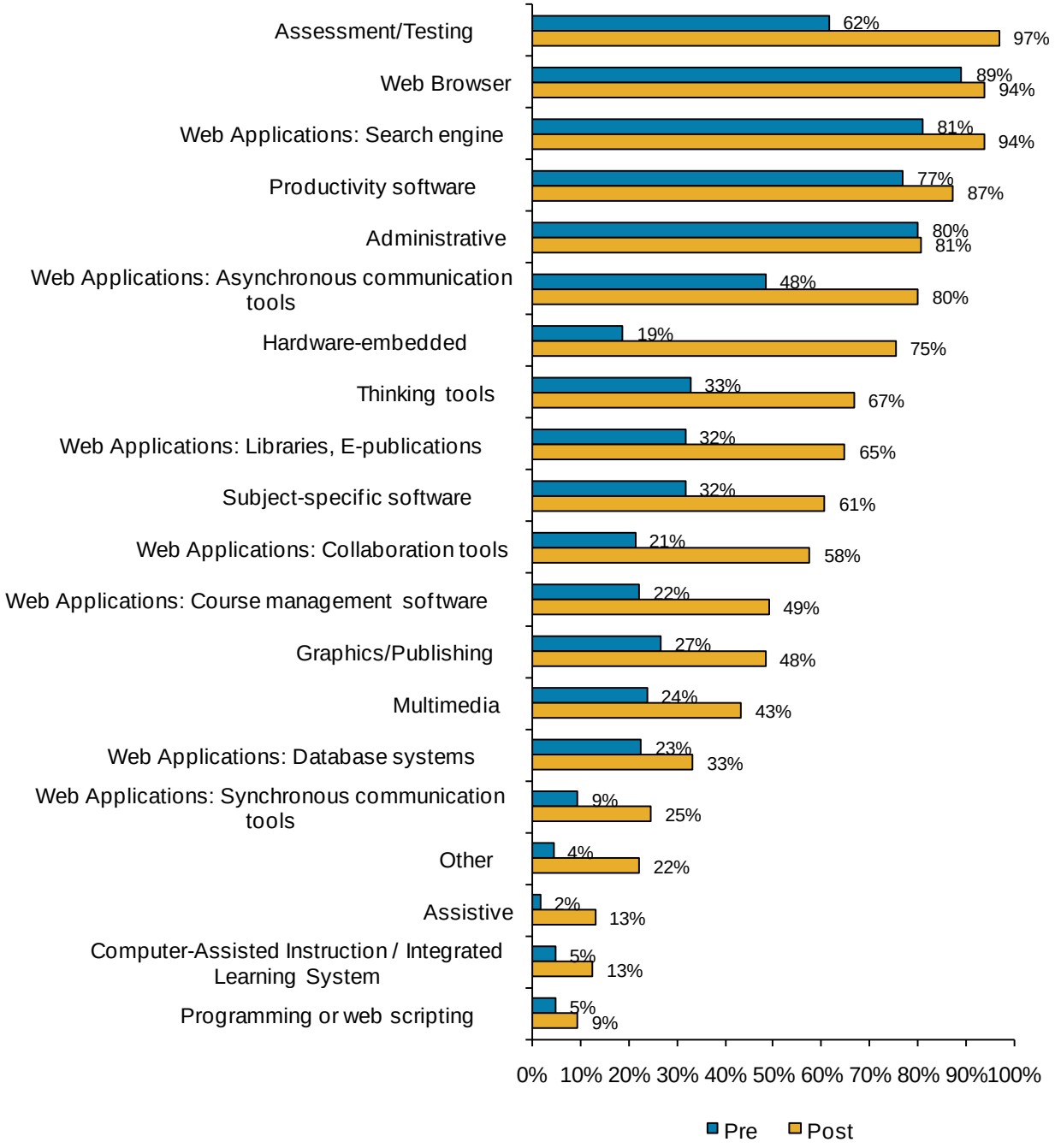
Figure 4. I design instruction that requires the use of these technologies by the teacher (treatment)*



*The number of responses ranged from 48 to 63 due to missing data.

More educators reported that they were able to design lessons using digital tools that meet instructional objectives post-implementation (95.3%) than pre (72.3%). In general, use of numerous relevant computer applications increased post-implementation. Assessment/testing, web browsers, search engines, and productivity software, administrative applications, and asynchronous communication tools were the most popular computer applications among ARRA teachers, typically being administered in student instruction by greater than three-quarters of educators. Hardware-embedded resources (e.g., interactive whiteboard, GPS/GIS) saw the biggest change, being used by 75.4 percent of educators post-implementation (up from 18.8%). Thinking tools (e.g., simulation, visual organizer), collaboration tools, and asynchronous communication resources (e.g., blogs, discussion boards) also saw an increase in usage. While the treatment group increased, the control group also increased in their use of hardware-embedded resources (increase of 42.4%), assessment/testing (increase of 41.1%), and collaboration tools (increase of 33.3%; see Figure 5 below, and Figure 78 in Appendix 6 for control group percentages).

Figure 5. What computer applications did/do you use in your instruction with students? (treatment).*



*The number of responses ranged from 27 to 65 due to missing data.

Observational data from the last teacher walkthroughs show similar trends to the Educator Survey data in the top teacher technology uses. Specifically, teachers were observed using hardware-embedded technology (44.4%), productivity software (21.2%), administrative (21.2%), assessment/testing (21.2%), and thinking tools (16.2%). Minimal changes were observed

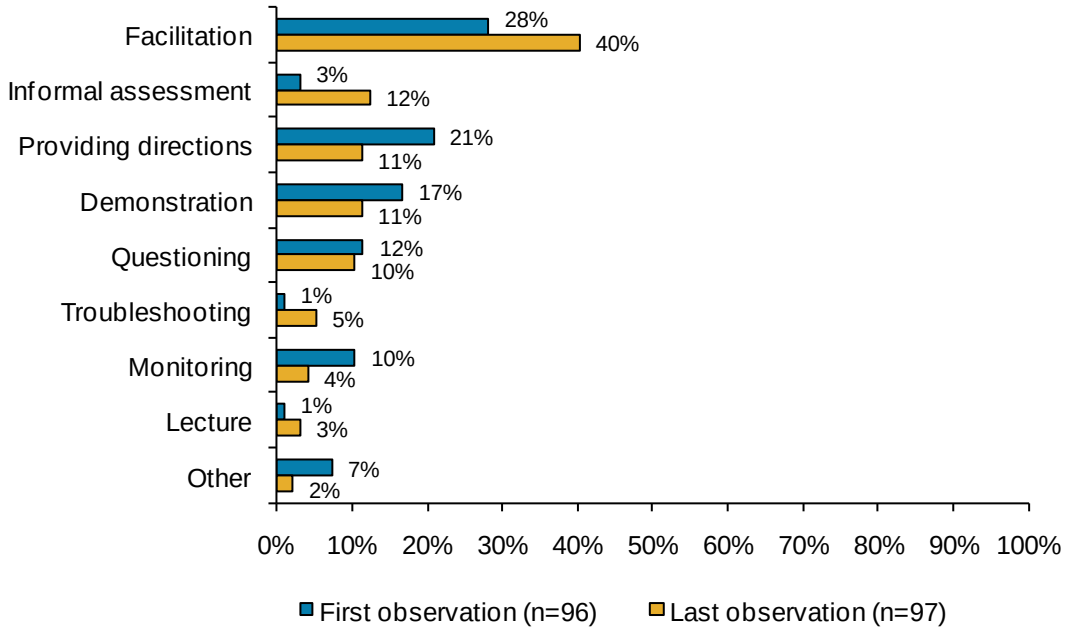
through walkthrough observation data over the course of the grant, with the exception of the increase in multimedia use by teachers by 10.0 percent (14.1% last observation; 4.1% first observation).

Using the NH STaR Chart, district administrators indicated their patterns of teacher use (*M*=2.39 out of 4) and impacts of the technology on teacher roles (*M*=2.34 out of 4) as *developing*, with no significant change from pre to post. Districts reported significantly higher levels of progress in the integration of technology into curricular areas post-implementation (*M*=2.66 post; *M*=2.21 pre).[20]

Likewise, a greater proportion of educators agreed they purposefully adapted lessons to include digital tools post-implementation (96.9%) than pre (70.3%); by comparison, control teachers only saw an 11.3 percent increase (75.0% post; 63.7% pre). Grant participants who *strongly agreed* increased substantially (33.6%). Also, while over half (61.5%) of educators used digital tools to personalize learning activities for individual student needs pre-implementation, those who were able to do so post-implementation dramatically increased to 96.9 percent (compared to 66.6% post and 50.0% pre for control group teachers).

In observations of treatment teachers, the dominant teacher activity did not vary greatly from first to last observation, with the exception of facilitation, which increased by 12.1 percent (40.2% last observation; 28.1% first observation). Facilitation was the most frequent teacher activity, followed by informal assessment, providing directions, demonstrating, and questioning (see Figure 6).

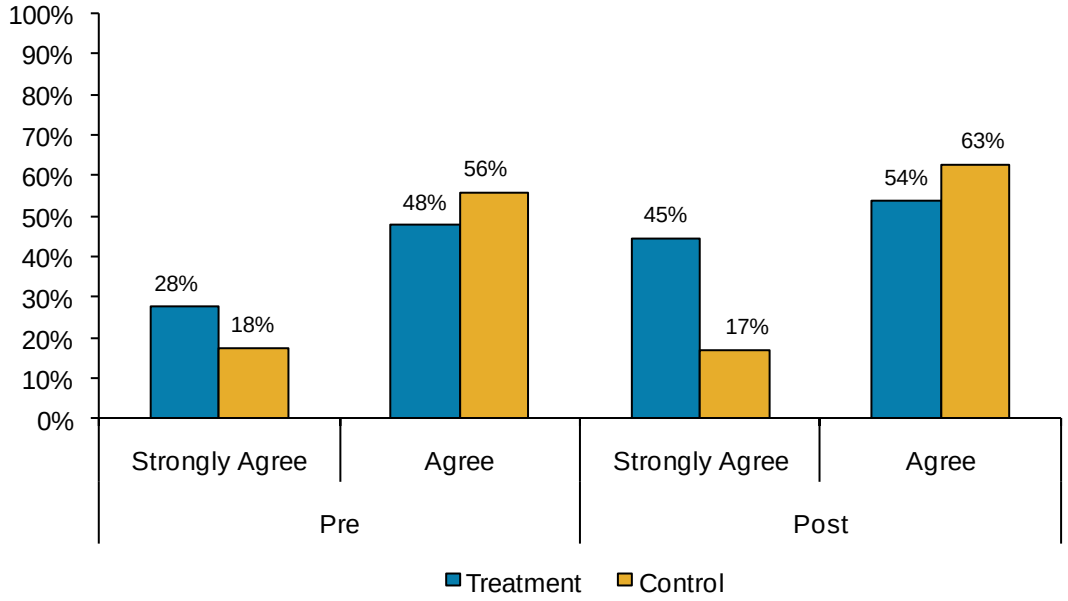
Figure 6. Dominant Teacher Activity (treatment)



[20] *t* (18) = 3.26, p<.005 (two-tailed), paired samples

Some of the increases mentioned above may have been a result of educators' increased confidence in using technology in the classroom. Post-implementation, nearly all treatment teachers surveyed (98.4%), *agreed* or *strongly agreed* with the statement that they felt comfortable with using instructional technology (up from 75.4% pre, and compared to the control group at 80.0% post and 73.5% pre; see Figure 7).

Figure 7. I feel comfortable using technology in my classroom (selected *Strongly Agree* or *Agree*)*



*The number of responses was 65 for treatment group and 34-35 for the control group due to missing data.

Likewise, the percentage of treatment educators who felt proficient at using technology in their instruction increased by 27.6 percent (86.1% post vs. 58.5% pre; compared to 60.0% post and 44.5% pre of control teachers). Nearly all teachers and administrators stated in the Spring 2011 focus groups that their comfort level with using technology in the classroom increased as a result of the ARRA grant, though several teachers expressed their desire to learn more in order to increase their comfort and advance their knowledge of integrating technology into the curriculum.

In addition to observing an increase in teachers' comfort level in using technology in the classroom, educators were also ubiquitously modeling safe and ethical technology use for their students. Both treatment and control teachers' saw an increase in those who *agreed or strongly agreed* to this statement (100.0% treatment, post; 94.4% control, post). On average, administrators felt most educators' levels of understanding were *developing* (*M*=2.42 out of 4) on the NH STaR Chart.

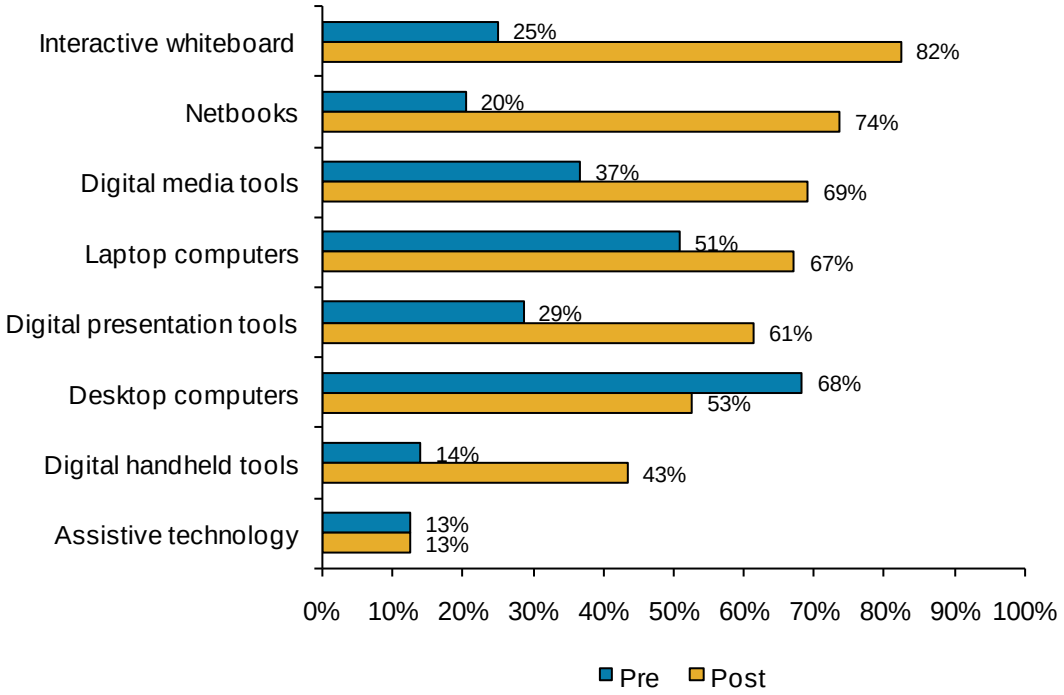
In observations of teachers, observers reported minimal changes in teachers' technology virtuosity from first observation to last observation. In general, the largest change (9.8%) reported was in *teacher actively discovers new technology skills in collaboration with students*

(25.9% last observation vs. 16.1% first). In general, the data show that nearly a third of teachers observed (31.8%) actively *facilitated students' discovery of new technology skills*, and over a quarter of teachers (28.2%) *relied on prepared materials to help students learn new technology skills*. However, a substantial percentage of observations reported that the use and learning of new technology skills was not observed at all (31.8% of the last observations).

Student Practice

Several technologies were increasingly present in lessons and available for student use by the end of the school year. The use of interactive whiteboards, netbooks, digital media tools, laptop computers, and digital presentation tools far surpassed desktop computers in classrooms that received grant support. Educators reported some sharp increases in designing instruction that requires the use of technologies by students, specifically interactive whiteboards (57.3%; as compared to a 40.6% increase for the control group), netbooks (53.2%; as compared a 40.4% increase for the control group), and digital presentation tools (32.8% increase, compared to 18.1% for the control group; see Figure 8 below, and Figure 79 in Appendix 6 for control group percentages).

Figure 8. I design instruction that requires the use of these technologies by the student (treatment)*

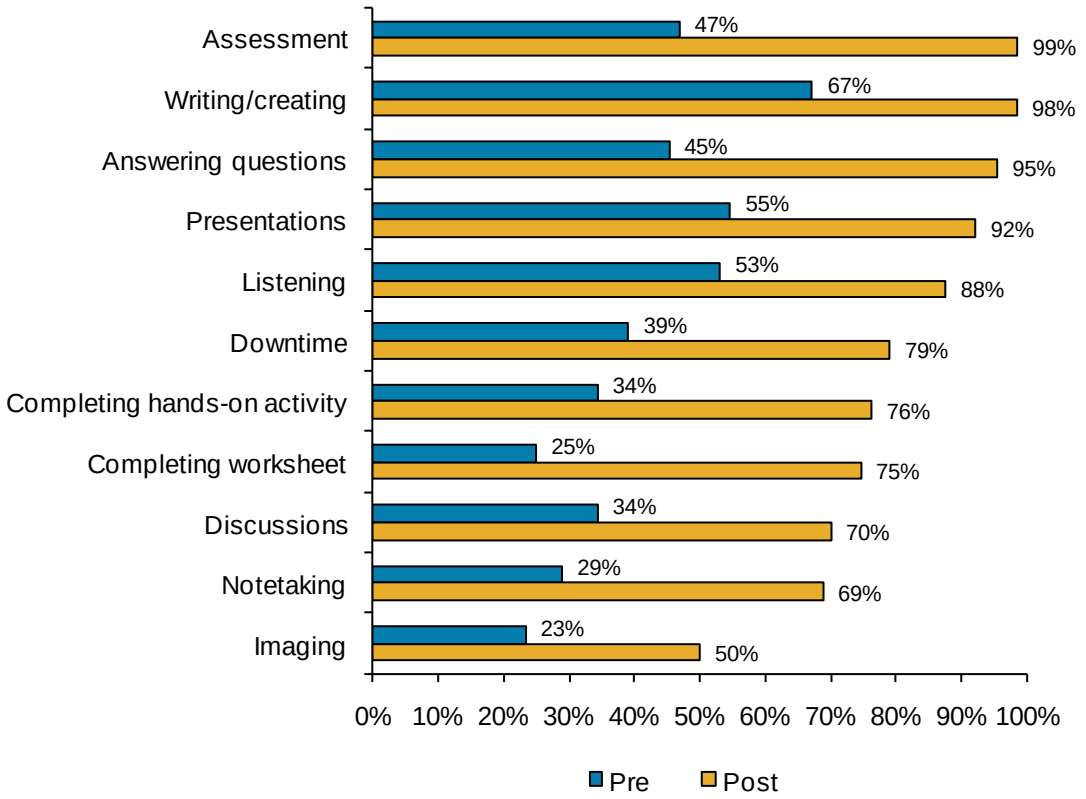


*The number of responses ranged from 48 to 63 due to missing data.

Post-implementation percentages of teachers in ARRA classrooms who reported that students used the above technologies specifically for learning purposes at least two times a week increased by 51.7 percent (81.0% post, 29.3% pre); by comparison, control group teachers' reported use of learning technologies at least two times a week increased as well, but to a lesser extent of 22.4 percent (58.8% post, 36.4% pre).

Post-grant, teachers reported a higher percentage of students using technology for particular activities (see Figure 9). The most substantial changes were with assessments (51.6% increase), answering questions (50.1% increase), and completing worksheets (49.6% increase). More educators also prompted their students to use technology during their downtime, contributing to a classroom culture in which technology was more securely embedded into all facets – formal and informal – of instructional practices. Student use of technology during these learning activities also increased for control group classrooms (see Figure 80 in Appendix 6); however, treatment teachers saw approximately a 13 percent increase (averaged across the items) over control teachers.

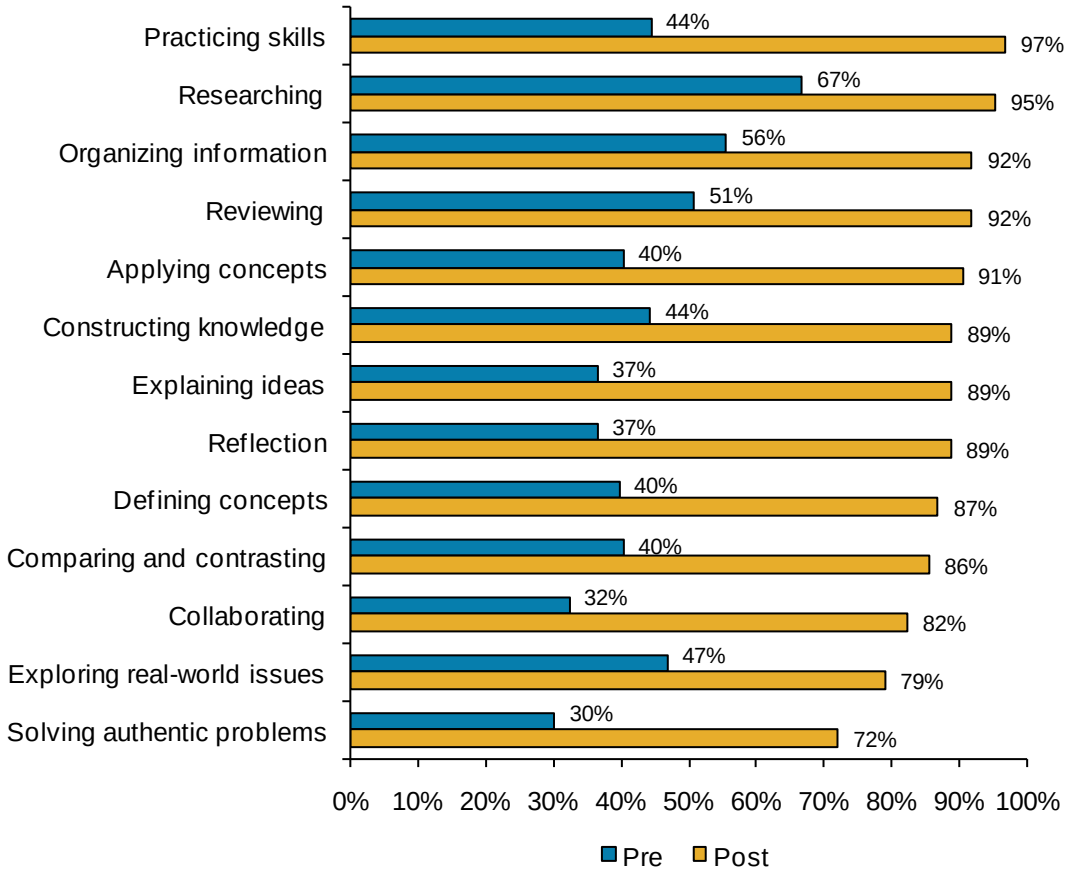
Figure 9. For what activities did/do your students use technology? (treatment)



*The number of responses ranged from 60 to 65 due to missing data.

Educators reported using technology for a variety of instructional purposes post-implementation, though primarily for practicing skills, researching, organizing information, and reviewing. Pre-implementation, between 30.2 percent (solving authentic problems) and 66.7 percent (researching) of teachers reported using technology for the specified purposes listed in Figure 10 (see Figure 81 in Appendix 6 for control group figure), and the range increased 72.1 percent (solving authentic problems) to 96.8 percent (practicing skills) at the conclusion of the grant.

Figure 10. For what purposes did/do your students use technology? (treatment)

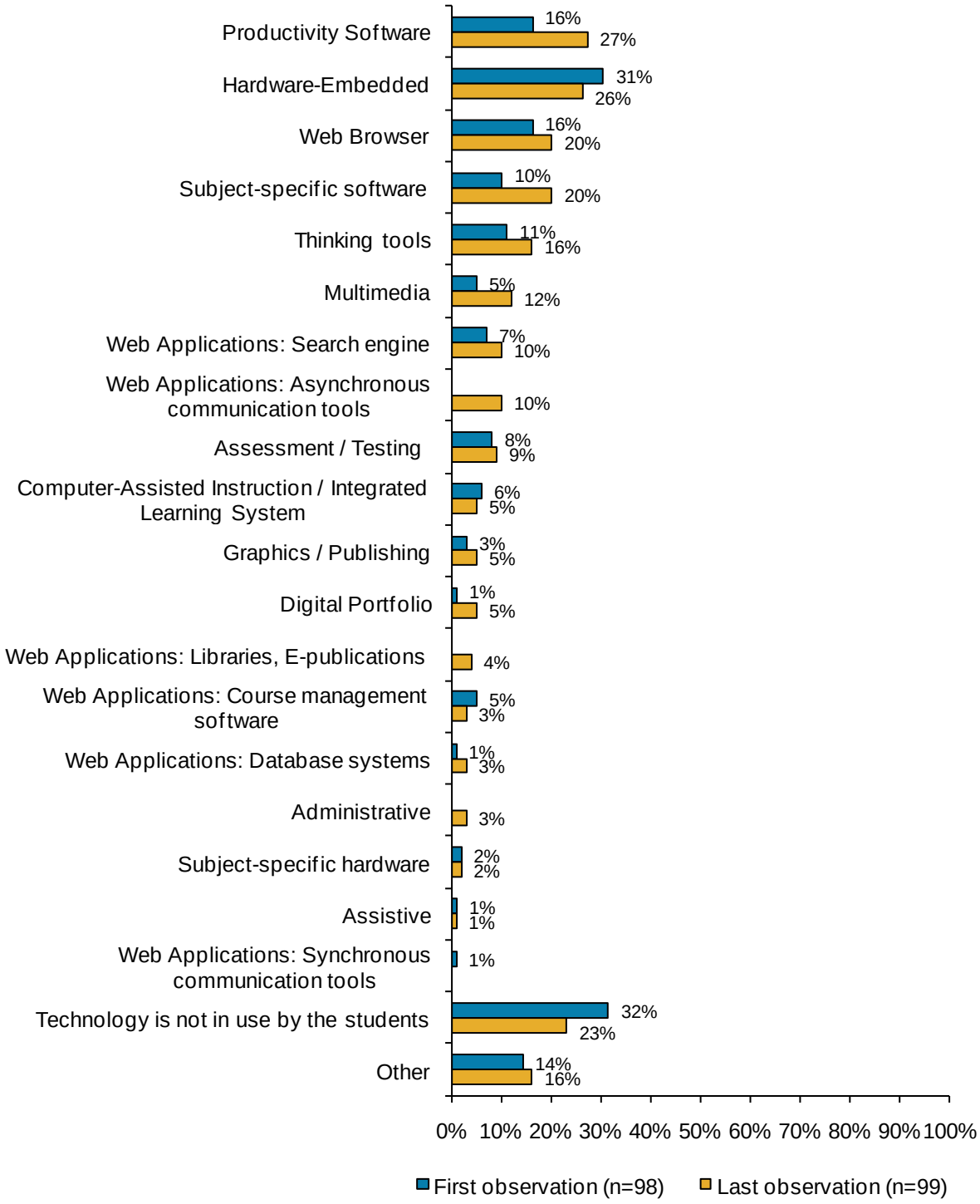


*The number of responses ranged from 61 to 64 due to missing data.

Observations of teachers and their students showed that more than half of students (61.7%) were using technology devices during the observation period. Observations also showed a change in class grouping structure – whole class activities decreased by 21.6 percent (42.3% last observation; 63.9% first), and individual activities increased by 16.5 percent (24.7% last observation; 8.2% first). The frequency of cooperative small groups was approximately the same at both times (24.7% last observation; 18.6% first). Partners (6.2% last observation; 5.2% first) and non-cooperative small groups (2.1% last observation; 4.1% first) were least common at both observation points.

Students were observed most frequently using productivity software, hardware-embedded technology, web browsers, subject-specific software, and thinking tools (see Figure 11). Between the first observations and the last observations, increases were observed in student use of productivity software by 11 percent (27.3% last observation; 16.3% first), subject-specific software by 10 percent (20.2% last observation; 10.2% first), and asynchronous communication tools by 10.1 percent (10.1% last observation; 0.0% first). Also, observers less frequently reported that technology is not in use by students at the last observation (23.2%) than the first (31.6%), though the change is very slight.

Figure 11. Student Technology Use (treatment)



The walkthrough observations indicated minimal changes in students' hands-on technology use, with the largest change (13.5% increase) in students selecting from limited technology options to meet learning needs (16.8% last observation; 3.3% first observation). In general, observers

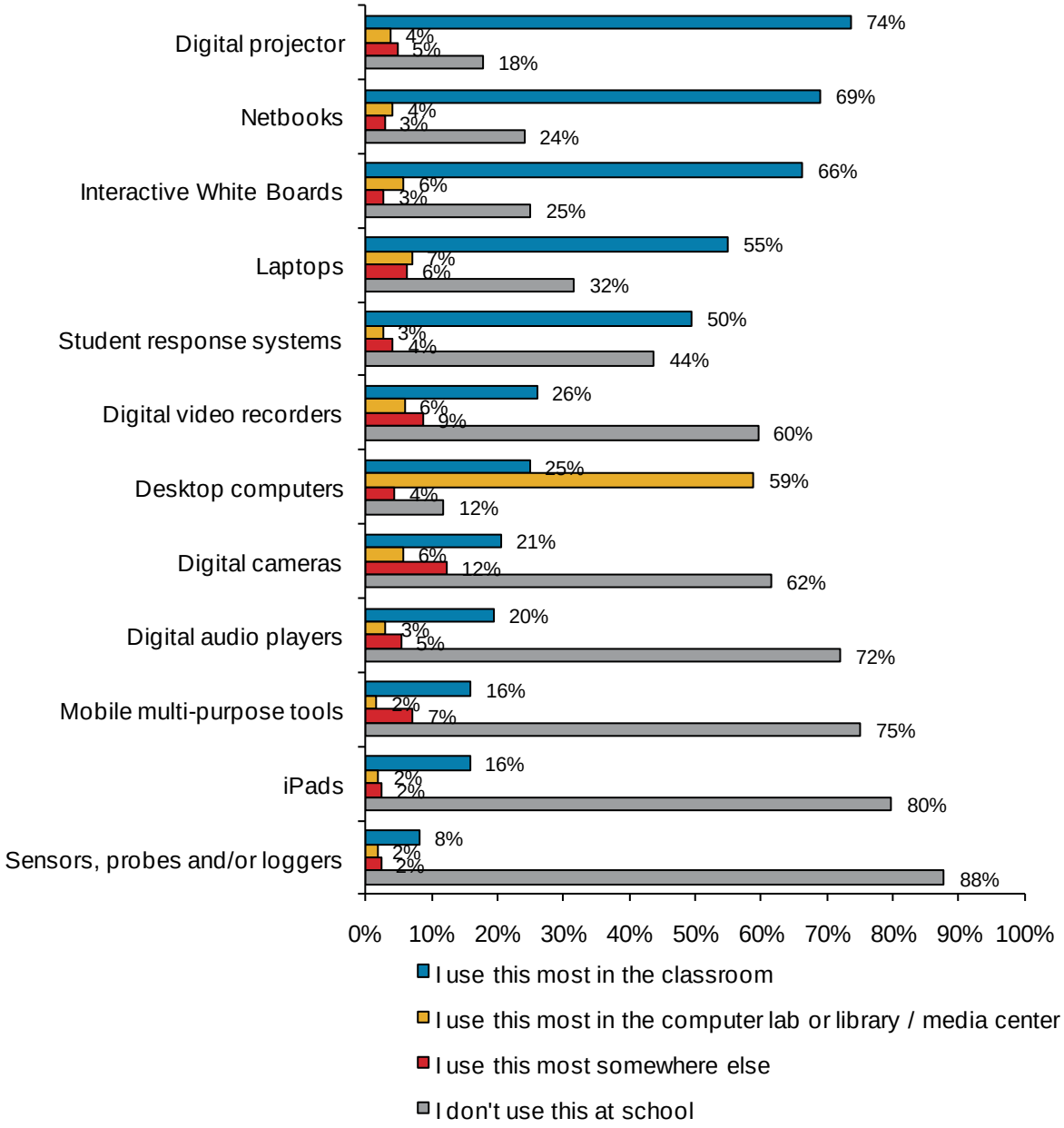
frequently reported that students independently controlled technology to complete an activity (54.7% last observation; 45.1% first observation) and that students observed the teacher using the technology (38.9% last; 36.3% first). Very infrequently do students adapt or choose from a broad range of technologies to meet their needs; however, a small increase was reported from the first (3.3%) to last (10.5%) observation.

Students also reported their technology practices and usage through the Student Survey. Treatment and control students most frequently indicated that they do not use a computer or netbook at school every day, both at the beginning (64.1% treatment vs. 66.4% control) and end of the school year (62.5% treatment vs. 74.1% control). Similarly, the majority of both control and treatment groups indicated that they share computers or netbooks (81.9% treatment vs. 97.0% control, end of school year). As these percentages remained steady from beginning to end of the year, the gap between control and treatment students is evident throughout the year, with more control students sharing their equipment with others.

Treatment and control students both tended to learn how to do new things with technology through the same media, and the percentages did not substantially change from the beginning of the school year to the end of the school year. In general, students tended to teach themselves (43.1% treatment, end of the year), learn from their teachers (21.7% treatment, end of the year), or from a family member (21.0% treatment, end of the year).

Treatment and control students reported using technologies in similar locations for schoolwork, with minimal changes from the beginning of the school year to the end of the school year. Digital projectors, netbooks, interactive whiteboards, laptops, and student response systems were all used in the classroom by 50 percent of treatment students, while desktop computers were primarily used in the computer lab or library/media center. Over 50 percent of students indicated they do not use digital video recorders or cameras, digital audio players, mobile multi-purpose tools, iPads, and sensors/probes/loggers (see Figure 12). At the end of the year, treatment students reported slightly more classroom access to netbooks (69.0% treatment; 60.0% control) and digital video cameras (26.0% treatment; 14.6% control), though control students reported more access to interactive white boards in the classrooms (66.3% treatment; 81.4% control).

Figure 12. At school, where do you use these technology devices most for schoolwork? (treatment; end of the year)*



*The number of responses ranged from 998 to 1018; for the purposes of this figure, option choices of "I use this most in the computer lab" and "I use this most in the library or media center" were combined.

While students' technology use remained fairly similar with regard to location of use, some differences were observed in the number of days per week technology was used in school for schoolwork (see Table 10). When compared to the control group, there were statistically significant increases in the average days per week that treatment students used desktop computers, netbooks, and digital projectors by the end of the school year.

Table 10. Days per week students use technology at school for schoolwork (treatment)

Thinking back to your most recent *full week of school*: how many school days did you use each of the following technologies at school for schoolwork?:	Time of School Year	N	Average days per week	Change
Desktop computers*	Beginning	1006	1.42	0.18
	End	1020	1.60	
Laptops	Beginning	1006	1.28	-0.09
	End	1019	1.19	
Netbooks*	Beginning	997	1.63	0.12
	End	1011	1.75	
iPads	Beginning	988	0.32	0.02
	End	1014	0.34	
Digital projector*	Beginning	991	2.34	0.11
	End	1010	2.45	
Interactive White Boards	Beginning	995	2.48	-0.30
	End	1014	2.18	
Student response systems	Beginning	996	0.71	-0.22
	End	1015	0.49	
Digital audio players	Beginning	999	0.58	-0.10
	End	1018	0.48	
Digital cameras	Beginning	993	0.41	0.00
	End	1015	0.41	
Digital video recorders	Beginning	993	0.38	0.00
	End	1016	0.38	
Mobile multi-purpose tools	Beginning	999	0.60	-0.05
	End	1010	0.55	
Sensors, probes, and/or loggers	Beginning	990	0.29	0.02
	End	1008	0.31	

* Change was statistically significantly greater than change for the control group (at $p<.05$). Results for the control group are in Table 24 of Appendix 6.

Students were asked to indicate the number of days per week (in their most recent full week of school) they had used technology for specific activities in classes (see Table 11). Students most frequently used technology for writing/creating (M=1.58 days a week) and least frequently used technology for completing hands-on activities (M=0.38). Over the course of the school year, changes in the frequency with which the treatment group did these activities were not statistically significantly different from the changes experienced by the control group.

Table 11. Days per week students use technology for specific activities (treatment)

Thinking back to your most recent *full week of school*: how many school days did you use technology to help you do the following activities in your classes at school:	Time of School Year	N	Average days per week	Change
Listening	Beginning	533	1.03	-0.25
	End	512	0.79	
Completing worksheets	Beginning	534	1.39	-0.26
	End	512	1.13	
Note taking	Beginning	531	1.42	-0.33
	End	511	1.08	
Answering questions	Beginning	530	1.66	-0.51
	End	510	1.16	
Participating in discussions	Beginning	530	1.16	-0.32
	End	507	0.84	
Preparing and giving presentations	Beginning	534	1.24	-0.19
	End	512	1.05	
Writing/Creating	Beginning	530	1.59	-0.01
	End	510	1.58	
Completing a hands-on activity (like Lego Robotics)	Beginning	533	0.45	-0.07
	End	509	0.38	
Creating and editing digital images	Beginning	532	0.57	-0.01
	End	509	0.56	
Taking tests	Beginning	531	1.03	-0.24
	End	513	0.79	
Spending free time	Beginning	531	1.31	-0.28
	End	509	1.03	

Note: Change was *not* statistically significantly greater for any items than the control group. Results for the control group are in Table 25 of Appendix 6.

Students were also asked to indicate the number of days per week (in their most recent full week of school) they used technology for schoolwork when completing specific tasks (see Table 12). Students most frequently reported using technology to research a topic on the Internet (M=1.62 days per week) or create/edit papers in word processing software (M=1.60), and least frequently to create/edit their own website and/or blog (M=0.33). In general, the treatment group experienced negligible changes from the beginning of the school year to the end of the school year when compared to the control group. These findings indicated that while each group may have increased or decreased their use of technology when completing specific tasks, the presence of the ARRA grant resources did not have an effect on the magnitude of these changes.

Table 12. Days per week students use technology for specific tasks (treatment)

Thinking back to your most recent *full week of school*: how many school days did you use technology at school for schoolwork to:	Time of School Year	N	Average days per week	Change
Create and edit papers in word processing software, such as Microsoft Word	Beginning	533	1.56	-0.04
	End	515	1.60	
Record data using software like Excel	Beginning	534	0.60	-0.09
	End	511	0.51	
Create graphs or tables to display data	Beginning	529	0.76	-0.17
	End	507	0.59	
Create presentations (using PowerPoint or SmartNotebook)	Beginning	533	1.00	-0.06
	End	513	0.94	
Organize ideas graphically using software like Inspiration	Beginning	535	0.50	0.07
	End	513	0.57	
Organize and expand my digital portfolio	Beginning	531	0.57	-0.04
	End	513	0.53	
Communicate with teachers or other students about school work	Beginning	529	0.81	-0.17
	End	512	0.64	
Play educational games	Beginning	530	0.91	-0.15
	End	514	0.76	
Watch video clips online	Beginning	531	0.89	0.09
	End	509	0.98	
Research a topic on the Internet	Beginning	533	1.57	0.05
	End	509	1.62	
Create or update your own website or blog	Beginning	523	0.28	0.05
	End	508	0.33	
Create files on the computer that include video, audio, or animation	Beginning	529	0.47	0.03
	End	510	0.50	
Use software that prepares you for State or other standardized tests (like SAT prep)	Beginning	529	0.34	0.01
	End	513	0.35	
Work collaboratively with other students to create products	Beginning	527	0.74	-0.18
	End	514	0.56	
Share digital files with people outside of your school and family	Beginning	529	0.39	0.06
	End	510	0.45	
Communicate with experts (outside of your school and family) about topics related to your schoolwork	Beginning	524	0.37	0.00
	End	510	0.37	

Note: Change was *not* statistically significantly greater for any items than the control group. Results for the control group are in Table 26 of Appendix 6.

Treatment students reported most frequently using technology in science (*M*=2.32 days per week), and least frequently in world languages (*M*=0.67; see Table 13). Treatment students did experience significant increases in technology use in English, reading or language arts courses as compared to the control group. However, students in the treatment group experienced a significantly larger decrease in the frequency of their use of technology in math than the control group.

Table 13. Days per week students use technology in core subjects (treatment)

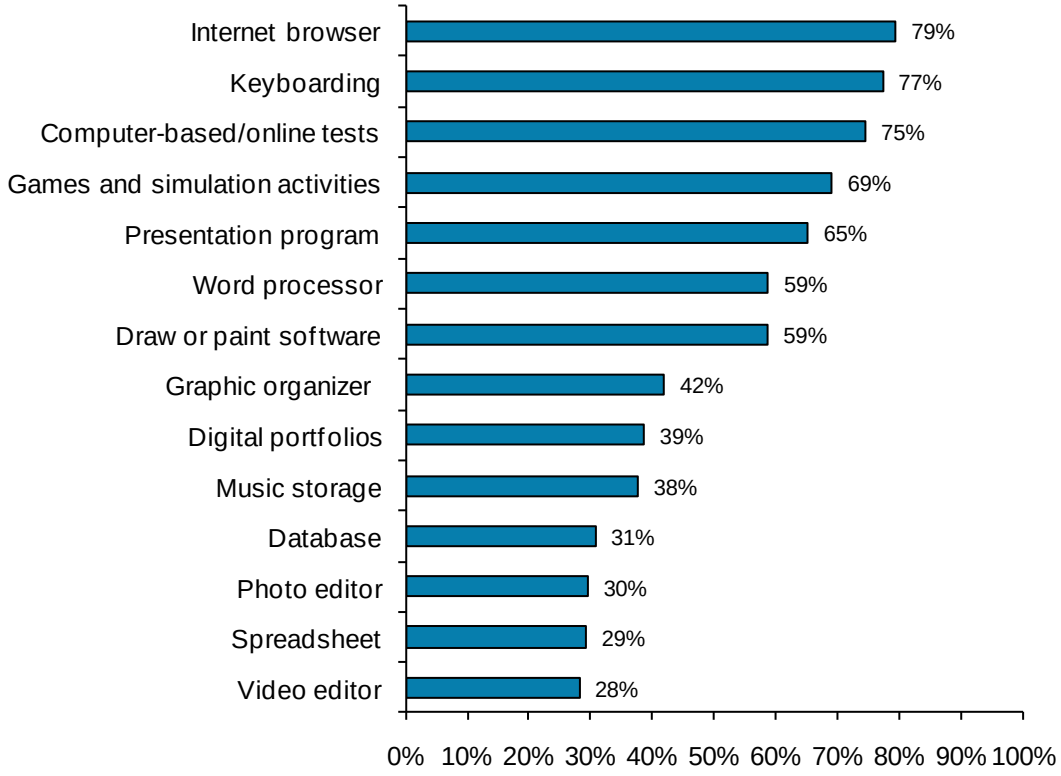
Thinking back to your most recent *full week of school*: how many school days did you use each one of your core subjects?:	Time of School Year	N	Average days per week	Change
English, reading or language arts*	Beginning	533	1.76	0.14
	End	513	1.90	
World languages	Beginning	380	0.75	-0.08
	End	382	0.67	
The arts (theatre, visual, music, dance)	Beginning	376	0.64	0.20
	End	359	0.84	
Math*	Beginning	526	2.05	-0.30
	End	510	1.75	
History/Social studies	Beginning	528	2.05	-0.15
	End	510	1.90	
Science	Beginning	517	2.28	0.04
	End	502	2.32	

* Change was statistically significantly greater than change for the control group (at $p<.005$). Results for the control group are in Table 27 of Appendix 6.
Note: "I do not take this subject" was also an option choice for this question; however, responses indicating this selection were removed from this analysis.

Treatment and control students tended to *rarely* (53.9% end of the year, treatment) or *sometimes* (25.4% end of the year, treatment) need help with technology, with minimal changes from beginning of the school year to end of the school year. A very small percentage of students *always* (1.5% end of the year, treatment) needed help when using technology.

Students were also asked to rate how much help they need with specific technology-related activities, and treatment students did not show substantial changes from the beginning to the end of the school year, as compared to the control group. The majority *rarely* or *never* needed help with Internet browser (79.4%), keyboarding (77.3%), computer-based/online tests (74.5%), games and simulation activities (69.1%), and presentation programs (65.2%; see Figure 13), and students *always* or *sometimes* needed help less than 20 percent of the time on the items provided.

Figure 13. Percentage of students who *never* or *rarely* need help with technology items (treatment; end of the year)*



*The number of responses ranged from 1010 to 1025 due to missing data.

Treatment and control students tended to do similar things when they have a problem with technology, with minimal changes from the beginning to the end of the school year. On the whole, students tended to ask an adult for help (47.8% end of the year, treatment) or try to fix the problem themselves (38.1% end of the year, treatment) when they encountered technology that was not working.

School technology specialists and administrators reported on student access in the NH School Technology Access Survey. Generally, the majority of students in grades K-8 had student accounts. While the percentage of students who could access these accounts at home (17.9% Spring 2011; 5.1% Spring 2010) or were permitted to regularly send and receive emails (17.9% Spring 2011; 10.3% Spring 2010) increased from Spring 2010 to Spring 2011, the percentages still remained low. One notable change over the grant period was that there was a 17.9 percent decrease in the percentage of schools allowing unlimited storage space on their servers (43.6% Spring 2011; 61.5% Spring 2010).

As reported by school technology and administrative staff on the NH School Technology Access Survey, schools provided students with a myriad of online content/provisions (all data are from Spring 2011):

- Internet-based distance learning content as a supplement to classroom learning: predominantly *Enchanted Learning* (28.9%), *Nettrekker* (26.3%), and *Grolier Online* (15.8%). Additionally, 31.6 percent of survey respondents indicated they provide "other" distance learning content. In open-ended responses, some participants indicated other content such as *United Streaming/Discovery Education* (n=7), *Edhelper* (n=4), and *IXL* (n=3).
- Course management system for students to access work online: predominantly *Moodle* (43.2%) and *Sakai* (16.2%)
- Digital portfolio solutions: most frequently *Sakai OSP* (21.1%), *Mahara* (15.8%), and *Adobe Acrobat Pro* (15.8%).

School Culture & Attitudes

Over the course of the grant period, treatment teachers became *less* likely to feel that planning lessons that use technology was more time consuming than planning lessons without those tools post-implementation (57.8% post; 71.9% pre); by comparison, there was virtually no change in opinions of control teachers (61.1% post; 64.7% pre). Treatment teachers' change may be a result of increased comfort levels in using and integrating technologies into the classroom. Also, as time goes on, teachers become more accustomed to planning lessons with technology, thus decreasing the amount of time it would take to plan a lesson with these tools. The majority of treatment teachers also did not generally believe that classroom management is more difficult when technology is involved (86.2% post and 76.9% pre).

Ultimately, nearly all treatment and control teachers believed instructional technology improved learning, and most treatment and control teachers felt that using instructional technology increased their instructional effectiveness, though percentages changed minimally from pre to post (95.3% treatment, post; 88.3% control, post). However, the percentage of treatment teachers who *strongly agreed* with this statement increased by 31.7 percent (60.9% post; 29.2% pre), as compared to a 14.7 percent increase for the control group (41.2% post; 26.5% pre).

Treatment and control educators both perceived that school and district administrators were interested in the degree to which they used technology effectively with their students. Both groups' positive perception of school administrators increased from pre to post (98.4% treatment vs. 94.3% control, post; 93.8% treatment vs. 80.0% control, pre), but treatment teachers who *strongly agreed* to the statement increased by 27.7 percent, compared to 14.3 percent for control teachers. Treatment teachers had a similar increase for district administrator perception (98.4% post, 92.3% pre), but control teachers remained virtually the same (88.5% post, 88.6% pre).

According to project managers completing the district-level NH STaR Chart, districts averaged a 2.61 (out of 4) for capabilities of building principals and district administrators. Participants in the Spring 2011 focus groups cited strong school- and district-level support, with many indicating that integrating technology into the curriculum to improve student achievement is a priority for their school and/or district. Several sites, however, expressed budgetary concerns in supporting this commitment.

Post-implementation, treatment teachers reported a higher rate of assisting one another in developing their technology skills (87.5% post, 76.9% pre), while the control group did not

change (61.7% pre and 62.9% post). The frequency of the sharing of ideas by treatment teachers to enhance learning among colleagues increased by 34.6 percent for those who share their ideas at least twice a week (12.3% pre and 46.9% post); by comparison, the control group saw a much smaller change (21.2% pre to 28.6% post).

Focus group participants most frequently identified informal sharing, school/staff/team meetings, common planning times, and conferences as mechanisms for teachers to share ideas. Some schools also use blogs, emails, Skype, or Wiki sites to share ideas with one another. One site indicated that open classroom layouts allow for additional opportunities for teachers to share and collaborate.

Barriers and Facilitators to Project Implementation

During the Spring 2011 focus groups, ARRA teachers and administrators mentioned several barriers or difficulties that impacted technology usage, including:

- Infrastructure and technical issues, including issues with the network, connectivity, compatibility and some building infrastructure issues
- Variances in students' and teachers' abilities to use the technology
- Lack of support (i.e. monetary, personnel)
- Timing of the grant and/or implementation (e.g., some schools received the technology later than anticipated, some schools received all the new technologies at once)
- Lack of time (for teachers to learn, plan, and share)
- Lack of availability of technology (e.g., some schools had to share and/or rotate the equipment, some schools had 3-4 students per netbook)

Project managers completing the NH Case Study Report identified similar challenges to project implementation, though project managers also discussed issues setting up and managing the equipment from the grant as an implementation challenge. Planning challenges identified by project managers on the NH Case Study Report included choosing the best technology to use and coordinating the ordering/receiving of the technology; budgeting for the project; and training staff (including technology staff members). A few other challenges included limited time, dealing with the scope of the project, and delays with equipment.

Several project managers project managers completing the NH Case Study Report advised teachers to be open to trying new things, not give up, and avoid doing everything at once. One project manager wrote, "We would suggest another school might want to remember the old adage 'less is more' and involve more people in their technological change efforts, but expect each to take on less individually." Also, a project manager recommended providing "inspiration and support to educators," and continued on to write, "Instill confidence and create a climate where taking risks is supported, even encouraged. Teachers need to be reminded to have fun in their teaching, and make it relevant to the children with whom they have the privilege to work." As one teacher stated, "Don't try to do everything at once. It's a lot. Don't use technology for the sake of using technology. Start with something you know so it won't seem so difficult."

Notably, a few focus group participants emphasized the importance using technology as a tool assist with improving student achievement, and not simply as the only way to improve student achievement. As one administrator stated, "A lesson we tried to instill from the very beginning

[is] that [technology] is a tool. This is not your curriculum. You're not going to be a fabulous teacher just because your students have 1:1 access, and class is not going to be exciting just because you let them use Wikipedia. You have to do good work. I don't think that's been a problem for us, but it's just something to make sure to reiterate."

However, participants also identified a number of facilitators for implementation. Interestingly, several facilitators were also presented as barriers by teachers and administrators. Some facilitators included:

- Professional development
- Increased access to technology and increased use of technology
- Support (technology specialists, technology integrators / consultants, and general school- or district-level support) and teacher buy-in
- Teacher collaboration, planned (Professional Learning Communities, common planning time, and other meetings) and unplanned (general sharing of ideas)
- General excitement (of teachers and students) and willingness to use and troubleshoot technology
- Time to learn, plan, and share with other teachers

Project managers completing NH Case Study Report also identified professional development, support (e.g., technical specialists, school-level support, community support) and teacher buy-in, as well as time for collaborating, learning, and sharing. Some project managers also indicated that coordinated grant management and a strong project plan were essential conditions for the project's success.

RQ2: To what degree are these technology-rich settings encouraging mediating outcomes for students, including interactive learning, higher-level thinking skills, and student engagement?

Educators find technology contributes not only to student learning, engagement in schoolwork, and 21st century skill-building, but also to their own capacities in engaging students in various learning activities and promoting more advanced cognitive practices. While teachers recognize the potential benefits of the technologies for students, students generally did not report significant changes in their use of technology for the development of higher-level thinking skills. As both students and teachers continue to explore and integrate technology resources and overcome some implementation barriers, changes in students' use and positive perceptions of technology may increase.

Impact of Technology on Student Engagement

The vast majority of focus group participants felt that student engagement (which focus group members tended to define as one or more of the following: interest, enjoyment, confidence, active participation, and motivation) increased over the course of the ARRA grant. For example, "We had lots of kids going beyond [their usual schoolwork] because they were allowed to use technology for the beyond activity." This teacher went on to indicate that without the technology, some of those students would not put forth extra effort after finishing an assignment and might "pretend to be busy." Another teacher indicated that it is evident that the technologies

are engaging students because of students' "open eyes and upright posture compared to the slouching and fading out." Also, an administrator stated similar thoughts:

> For the kids who are made for school, the ones that are excited about learning, [technology is] a tool that's helped them in their learning to be more efficient. The bigger benefit has been for kids who are not really that interested in school and they have a lot of other things going on in their lives and school doesn't rate too high. I would say this is one of the best things we have seen in terms of increasing their engagement.

Teachers working with students were asked specific questions on the Educator Survey regarding their perception of the impact of technology on student engagement and other mediating outcomes. Comparing data prior to project implementation (pre) to data at the conclusion of the project (post), educators reported observing an increase in students' motivation to complete tasks, ability to stay on-task, and engagement in technology. Treatment teachers reported an increase of over 27 percent in all of these statements regarding student engagement from pre to post-implementation. Also, both the control and treatment groups responded similarly to these questions pre-implementation, indicating that the groups' perceptions were initially equal; however, while the treatment group showed substantial positive increases post-implementation, the control group only showed modest increases, with the largest increase (15.0%) with regards to student motivation (see Figures 14-16 below; see Figures 82-84 in Appendix 6 for control group percentages). This suggests that the technology implementation in ARRA teachers' classrooms had a positive impact on teachers' perception of student engagement and motivation.

Figure 14. Students are motivated to complete tasks when using technology (treatment)

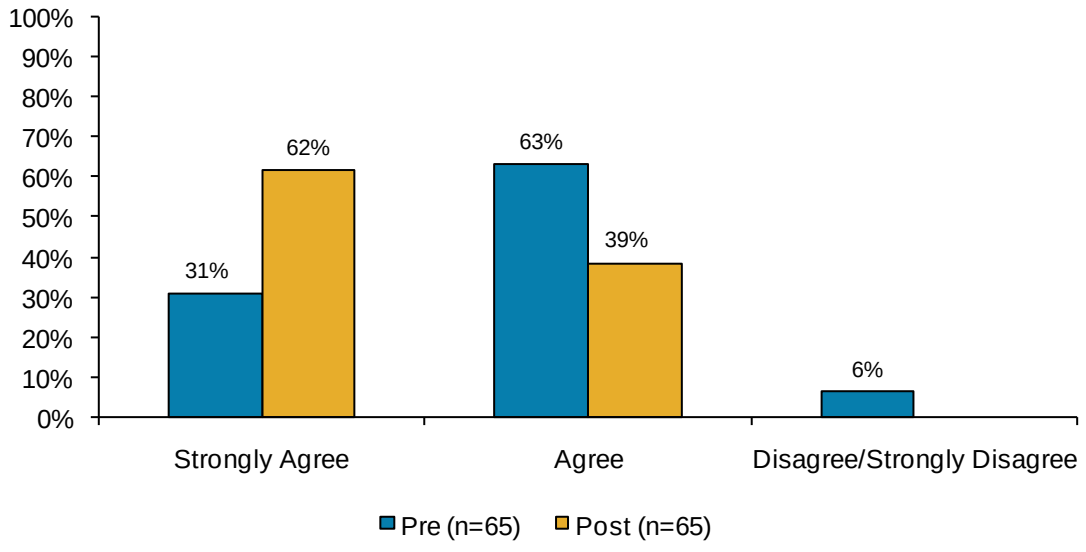


Figure 15. Students are on-task when using technology (treatment)

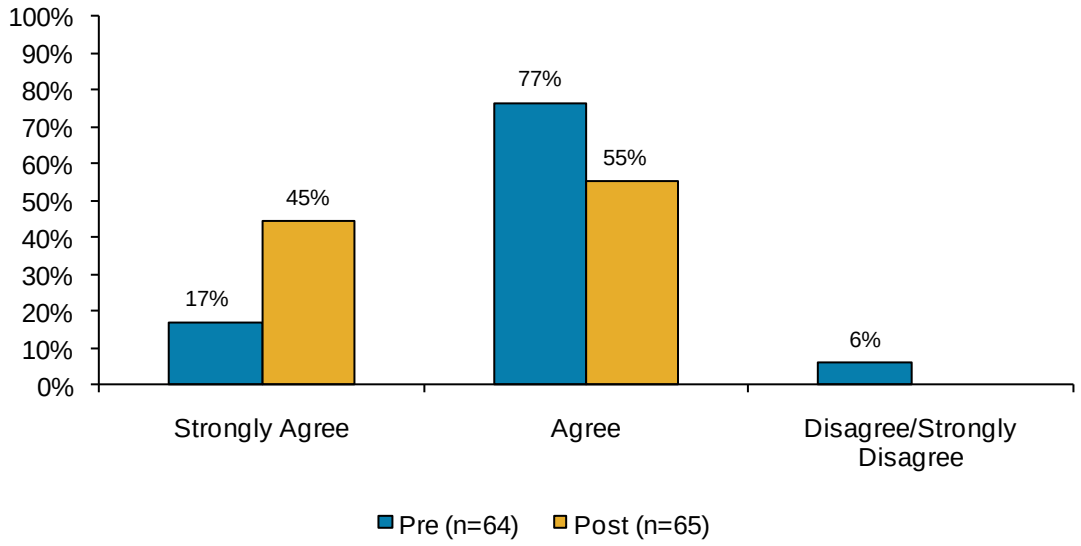
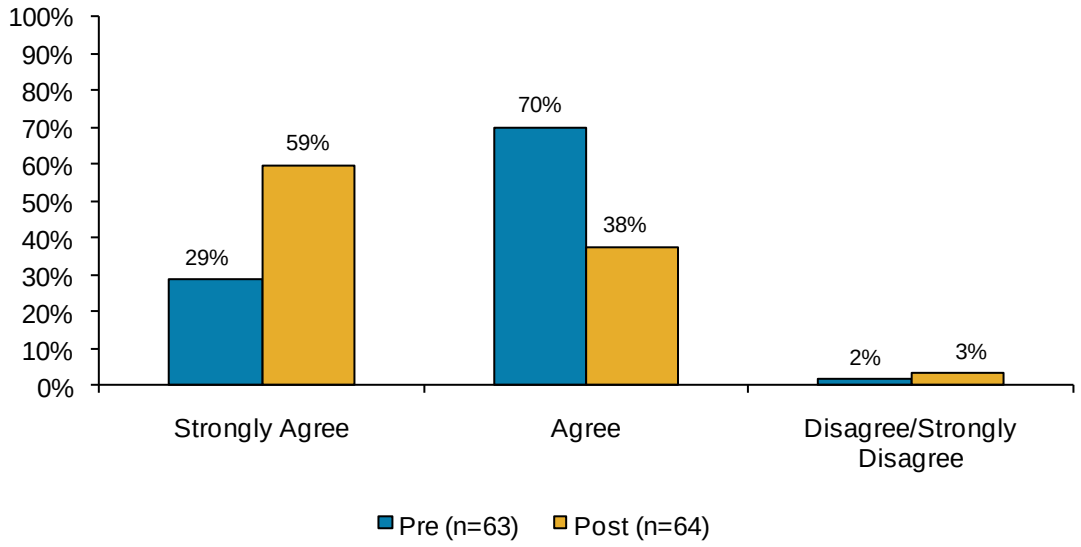
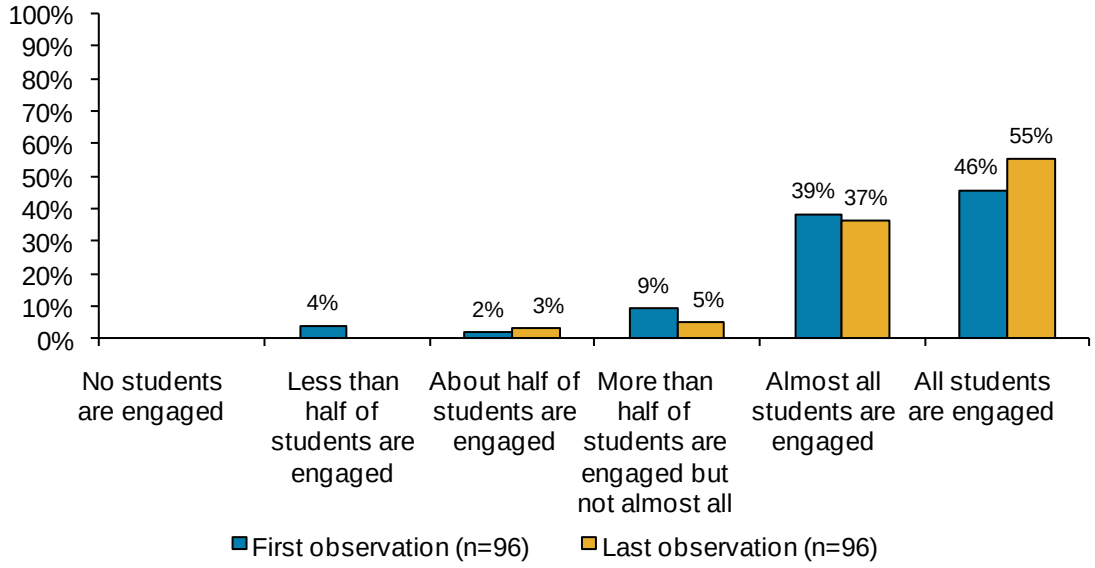


Figure 16. Students are engaged when using technology (treatment)



Data from the observation tool also suggests a slight shift in the percentage of treatment students who were engaged, as the percentage of treatment students who were *all* engaged increased 9.4 percent from the first to last observation. This change supports teachers' observations of increased student engagement, though to a somewhat lesser extent as the change was not very substantial (see Figure 17).

Figure 17. Proportion of students engaged (Walkthrough Observation Tool; treatment)



Students were also surveyed at the beginning and end of the 2010-11 school year, and were asked to indicate their level of agreement to a series of statements about using technology.[21] Contrary to educators, student self-reported outcomes and attitudes toward the new technology remained unchanged over the course of ARRA project implementation. Specifically, over half of treatment students agreed they are more interested in schoolwork (61.0% end of the school year) and more organized (65.2% end of the school year) when they use technology than with other resources, though the percentages did not change over the course of the school year. Both treatment and control students reported a notable decrease of enjoyment in participating in classes when technology is used from Fall 2010 (71.9%) to Spring 2011 (62.3%); by way of comparison, the control group saw a decrease from 65.8 percent in Fall 2010 to 49.8 percent in Spring 2011.

Over 65 percent of treatment students felt they could figure out new technologies quickly (67.2% in Fall 2010; 66.5% in Spring 2011), and many reported that they do *not* give up when schoolwork using technology is difficult (61.1% reported *strongly disagree* or *disagree* to "I give up when schoolwork using technology is difficult" in Fall 2010; 55.4% in Spring 2011).

In addition, students tended to respond positively to the following items, with minimal change from Fall to Spring.[22]

- Technology makes learning fun (Always: 40.6%; Sometimes: 55.7%)

[21] These questions were only available to students in Grades 7-12. See methods section for details.
[22] Response options included Always, Sometimes, Never, and I Don't Know; Percentages reported in this bulleted list reflect end of year percentages only.

- Technology makes it easier to learn new things (Always: 36.1%; Sometimes: 57.6%)
- I like using computers for schoolwork more than I like using pencil and paper (Always: 54.2%; Sometimes: 34.0%)
- I enjoy being at school when I am using technology (Always: 40.2%; Sometimes: 44.7%)

Impact of Technology on Student Achievement and Interactive Learning

When asked to report on student achievement gains, most ARRA project managers discussed no specific evidence (as plans were in place to assess impact for the 2011-12 school year or otherwise) but provided anecdotal evidence of the increases in student engagement, motivation, or enthusiasm when using technology, as well as increases in students' comfort and confidence in using technology. Four sites identified specific classroom grading evidence (i.e. assessments) or experimental studies that showcased improvements in student achievement as a result of using technology, and two sites identified that their school reached Adequate Yearly Progress (AYP) as an indicator of student achievement.

Also, focus groups in Spring 2011 revealed that a small number of sites conducted experiments to assess impact and some sites planned to examine standardized test scores at the close of the 2010-11 school year. A few sites were wary of placing emphasis on the impacts of technology when the projects were in their infancy, or felt technology's impact on student achievement was difficult to "disentangle," according to one administrator, and that "more time and tools" was needed to truly assess the direct impact on student achievement. As another project manager stated in the NH Case Study Report, "We anticipate that in the years ahead, we will be able to see steady and significant growth in student performance on these assessment measures, but it is too early to have substantive results to report that tie directly to the effects of this grant."

Teachers were asked on the Educator Survey if they felt using technology in instruction improves learning. While most treatment teachers (98.4%) agreed or *strongly agreed* with this statement, their change from pre to post (1.5% increase) was not substantial as compared to the control group (94.3% post; 11.5% increase). Those who *strongly agreed* to this statement also increased for both the treatment (16.9% increase) and control (14.3% increase) groups, indicating that the ARRA grant did not impact teachers' belief that using technology in instruction improves learning, but that both treatment and control teachers' perceptions changed over time generally.

Anecdotally, nearly all sites discussed impacts on teachers and students that some felt will lead to increased academic achievement. For example, several sites indicated that the technology has increased:

- teachers' abilities to provide differentiated instruction or to reach different types of learners;
- teachers' abilities to connect students with "real world" content;
- students' classroom attitudes, behaviors, and confidence (including some sites stating less behavior issues);
- students' technology, higher-level thinking, and real-world skills;
- students' collaboration skills (with students and with teachers), as well as students' abilities to work, think, and learn on their own.

As reported in RQ 1, teachers reported increased use of technology in many interactive activities (e.g., assessments, answering questions, completing worksheets, and completing hands-on activities); however, control group teachers also reported increased use of technology in many activities, though the changes were not as impactful as the treatment group for most activities. Similarly, educators reported increases in student technology use for several learning purposes from pre to post; however, the control group also showcased noteworthy increases in many areas.

Walkthrough data also showed that there was virtually no change in the dominant student activities throughout the year. Primarily, students were completing hands-on activities (26.0% last observation vs. 18.5% first observation), answering questions (21.9% vs. 25.0%), or completing some other activity (14.6% vs. 20.7%). In open-ended feedback, some "other" activities identified included completing a quiz, work stations, researching, or online games. It was never recorded that students were "off-task."

Students were also asked to report on the number of days a week they used technology to help with particular activities. Students' responses across all activities changed minimally from the beginning to the end of the school year. At the end of the school year, students reported spending the greatest amount of time per week using technology for writing/creating (M=1.58 days) and the least amount of time for completing a hands-on activity (M=0.38 days; see Table 14).

Table 14. Days per week students use technology to help with activities (treatment)

Thinking back to your most recent *full week of school*: how many school days did you use technology to help you do the following activities in your classes at school:	Time of School Year	N	Average days per week	Change
Listening	Beginning	533	1.03	-0.24
	End	512	0.79	
Completing worksheets	Beginning	534	1.39	-0.26
	End	512	1.13	
Note taking	Beginning	531	1.42	-0.34
	End	511	1.08	
Answering questions	Beginning	530	1.66	-0.50
	End	510	1.16	
Participating in discussions	Beginning	530	1.16	-0.32
	End	507	0.84	
Preparing and giving presentations	Beginning	534	1.24	-0.19
	End	512	1.05	
Writing/Creating	Beginning	530	1.59	-0.01
	End	510	1.58	
Completing a hands-on activity (like Lego Robotics)	Beginning	533	0.45	-0.07
	End	509	0.38	
Creating and editing digital images	Beginning	532	0.57	-0.01
	End	509	0.56	
Taking tests	Beginning	531	1.03	-0.24
	End	513	0.79	
Spending free time	Beginning	531	1.31	-0.28
	End	509	1.03	

Just over half of treatment students (53.7%) agreed they wrote more when using technology than when using pencil and paper; however, this percentage remained nearly identical from the beginning of the year (51.7% agreed). Similarly, over half of treatment students feel they put forth their best effort at school when using technology (57.3% at the end of the year).

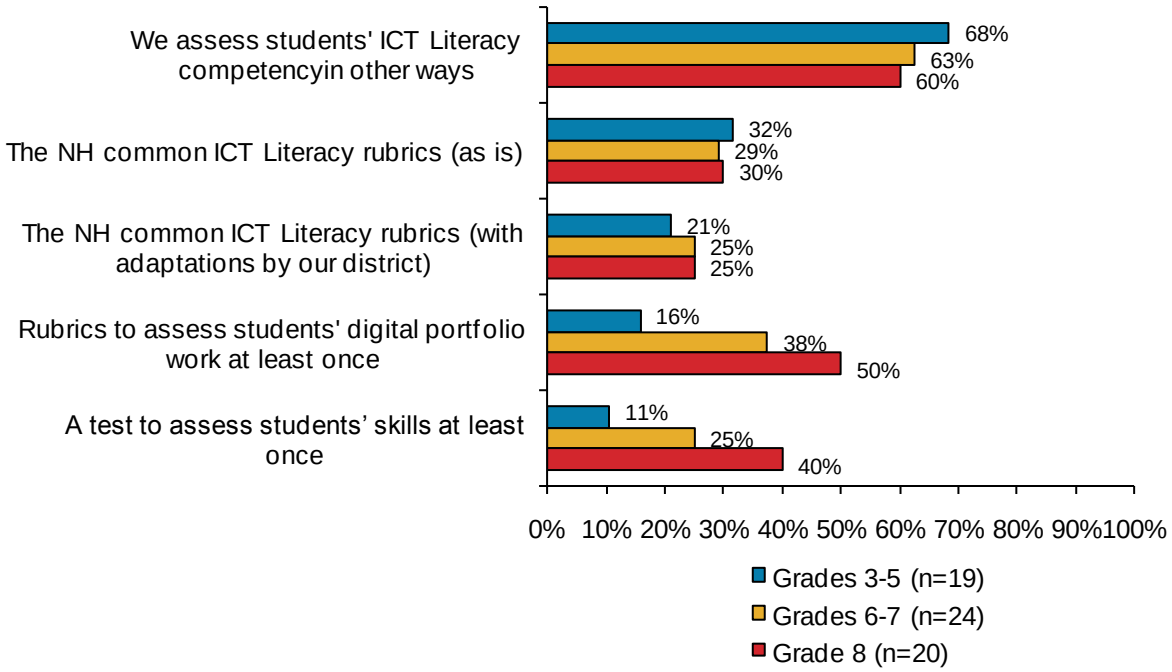
Also, many treatment students indicated they did learn new technology skills as a result of having access to new technology in their classrooms (64.9%), though a smaller percentage indicated they did not learn new skills (18.6%) or selected "I don't know" (16.4%).

Impact of Technology on Students' Higher-Level Thinking Skills

Some focus group participants indicated observing higher-level thinking skills among their students as a result of interacting with the new technologies. One administrator commented that students' engagement through technology "improves their cognitive ability, their thinking skills, their reasoning skills, and problem-solving skills and it is absolutely a great benefit to them." This administrator, like several other focus group participants, continued on to discuss the difficulty in measuring such impacts and stated, "I am not sure when we will be able to quantify that, measure it in a way, on a standardized test, but I can tell you absolutely their learning is more dynamic, more relevant, and more impactful than in a traditional setting."

Using standards adopted from ISTE NET-S to ensure students learned 21st century skills as a way to showcase changes in students' higher-level thinking skills, administrators were asked several questions on students' ICT literacy skills. In general, schools reported most frequently assessing students in grades 3-8 using "other" ways, with the exception of rubrics and tests which were more readily used for assessing eighth graders' ICT literacy skills (see Figure 18).

Figure 18. Ways ARRA schools are assessing students' ICT literacy skills in Grades 3-8 (Spring 2011; treatment)



ARRA administrators were also asked to report the number of students who met the six ICT competency requirements at the end of eighth grade. In 2010-2011, the average percentage of eighth graders who met each requirement ranged from 80.0 to 86.4 percent (as compared to 77.6 to 84.6 percent in 2009-10). While there was an increase in the average percent for the 2010-11 school year as compared to 2009-10, the increase is minimal (see Table 15 below). Also, as these data refer to all students enrolled in ARRA schools and not just those students that participated in grant-supported classrooms, caution should be taken in associating these results with grant activities.

Table 15. ICT competency attainment of eighth grade students at ARRA schools (treatment)

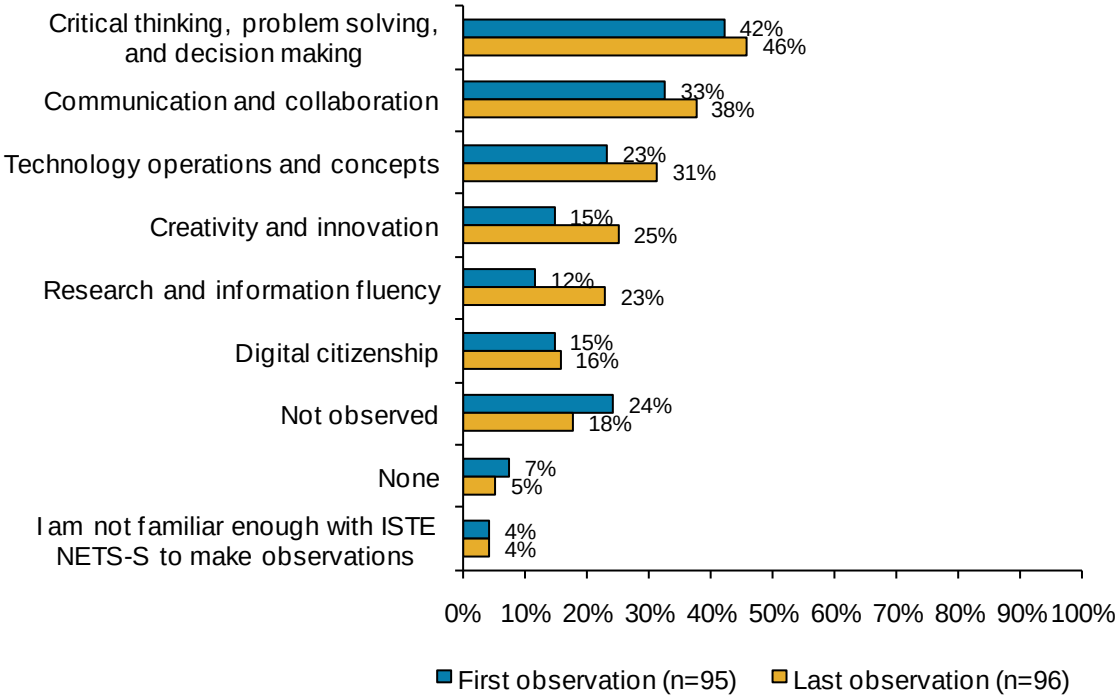
ICT competency requirement	School Year	n	8th Grade Enrollments (Mean)	# of 8th Graders Meeting competency Requirements (Mean)	% of 8th Graders Meeting Competency Requirements (Mean)
Creativity & innovation/productivity tools	2010-11	18	113.6	94.1	86.4%
	2009-10	21	125.7	109.4	81.9%
Technology operations and concepts	2010-11	18	113.6	95.1	86.2%
	2009-10	22	125.7	116.5	83.3%
Research & information fluency/research tools	2010-11	18	113.6	88.1	83.8%
	2009-10	22	125.7	115.8	84.6%
Digital citizenship/social, ethical, human issues	2010-11	18	113.6	87.7	83.0%
	2009-10	22	125.7	114.2	81.1%
Communication & collaboration / communication tools	2010-11	18	113.6	86.7	81.5%
	2009-10	21	125.7	108.0	77.6%
Critical thinking, problem solving, & decision making	2010-11	18	113.6	82.8	80.0%
	2009-10	21	125.7	98.6	80.5%

Note: Percentages represent averages derived from calculations at the individual school level and would not, therefore, align exactly with percentages derived from the mean numbers of 8th graders provided in the table.

Administrators providing feedback using the NH STaR Chart indicated similar results with regards to students' ICT literacy skills, as districts are *developing* in this area (*M*=2.23 out of 4).

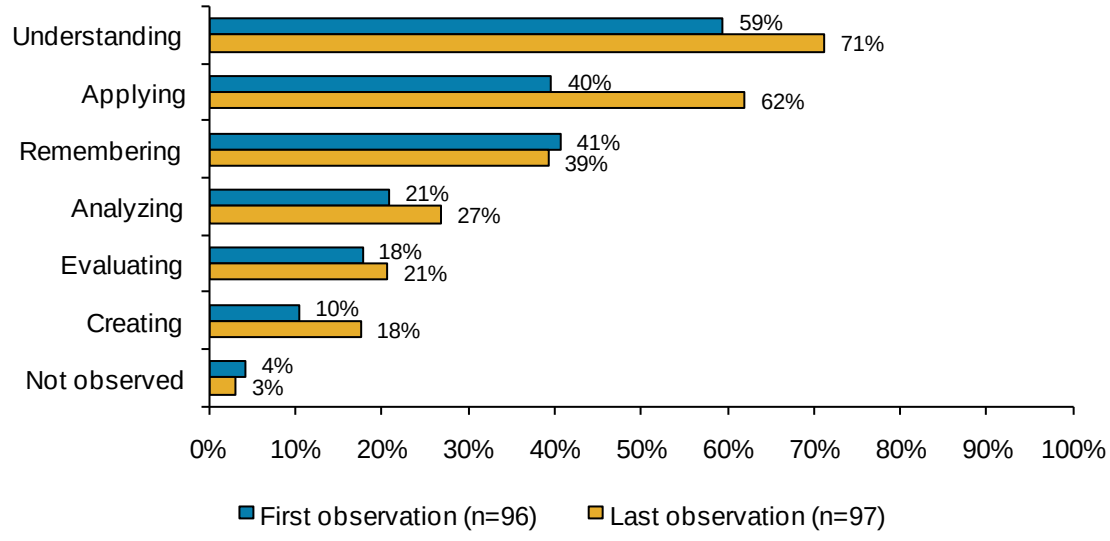
According to the walkthrough data, observers most frequently indicated that teachers addressed ISTE standards of *critical thinking, problem solving, and decision making* and *communication and collaboration*. As these categories were identified as having the lowest percentage of eighth graders meeting the competency requirement (see Table 15 above), it was possible that teachers were most frequently addressing those standards in order to increase students' skills in those areas. Teachers increased their focus on most ISTE standards over the course of ARRA project implementation, though the changes were not substantial (see Figure 19).

Figure 19. ISTE standards addressed during walkthrough observations (treatment)



Walkthrough data showed that the student cognitive level most often observed in classrooms was *Understanding*, which increased by 11.7 percent from first to last observation. *Applying* was the cognitive level with the largest increase of 22.3 percent (39.6% first vs. 61.9% last; see Figure 20). As most cognitive levels increased (with notable increases in *Understanding* and *Applying*), the data suggested that students were beginning to reach higher cognitive levels in the classroom. This should be tracked over time to see if increases continue in these cognitive areas, as well as the higher cognitive levels (analyzing, evaluating, and creating).

Figure 20. Student cognitive level (Walkthrough Observation Tool; treatment)



Students were also asked some questions regarding higher-level thinking, and most treatment students felt they were encouraged to be creative when using technology (60.5%). Also, nearly half (48.9%) of students agreed it was easier to understand schoolwork when using technology. A slightly higher percentage of treatment students (68.6%) agreed that learning about technology in school would benefit their future. Interestingly, there was little change in student responses from Fall 2010 to Spring 2011 for these statements when compared to the control group.

Potential barriers to achieving mediating student outcomes

As mentioned in RQ1, Focus Group and NH Case Study Report data indicated that many administrators identified a delay in the receipt of equipment, and some sites experienced unexpected technical difficulties (e.g., network or infrastructure issues) at the start of the 2010-11 school year. In addition, several teachers indicated that it took a lot of time to play with and learn the technology for successful integration into their curriculum. As one teacher stated, "I've [integrated technology into my curriculum] about 50 percent of what I would really want to do," and another indicated there was "always a higher goal to reach." Another teacher commented, "When it's truly integrated, the technology would be just like opening a book [for students]." While some teachers felt they had to make progress in incorporating technology into instruction, other teachers felt the use of technology was "natural" and that daily use was "a given."

Similarly, many administrators discussed a lack of time for professional development, and time for teachers to learn the technologies. As one project manager wrote in the NH Case Study Report, "Despite a strong PD budget in this grant, and a great attitude and willingness to try new things, [teachers] were still overwhelmed by the influx of multiple [technology] tools." Another project manager wrote, "It took time [for teachers] to create lesson plans that incorporated the new skills ensuring that future use would occur. It takes time and energy to implement these changes. It's a work in progress."

Some ARRA sites also reported issues with student use of the technologies and/or monitoring student use to promote safe and on-task behaviors. A small number of ARRA sites provided recommendations for overcoming those issues including: creating rules or policies about acceptable and/or appropriate use of technology; having guidelines about finding and using appropriate web resources; and creating a damage responsibility policy if students are permitted to take the technology home.

Overall, it is possible that the effects on student outcomes may be delayed into the coming years as a result of technical difficulties, delays in receiving equipment, and some lack of time for teachers to learn, plan and share their knowledge of the new technologies.

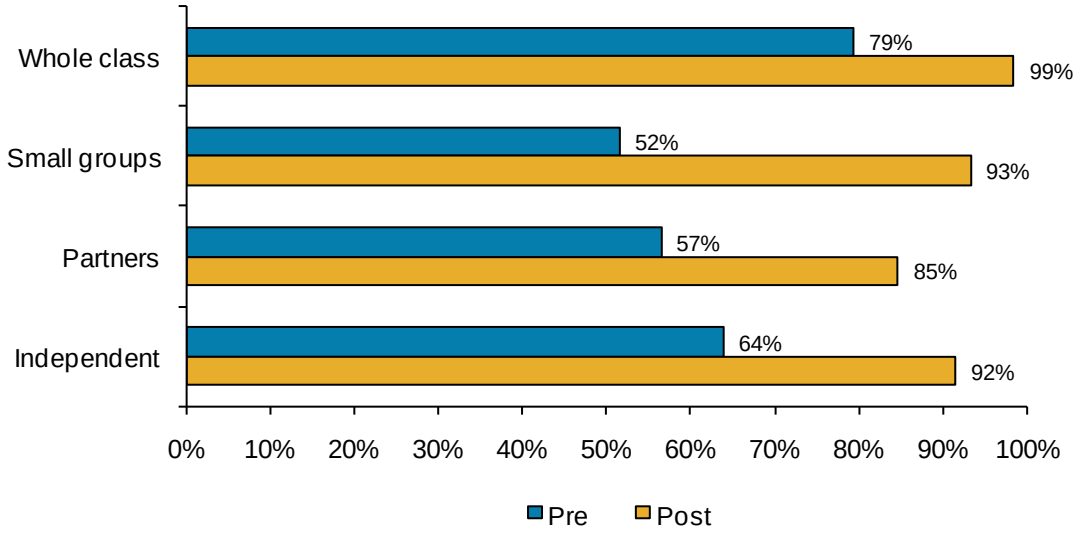
RQ3: To what degree does the provision of technology tools translate into real opportunities for students to collaborate and connect with new content?

Educators report growing student opportunities and modalities for collaborating and gaining new content knowledge. While individual and whole-class/teacher-led applications of technology remain popular, small-group and paired activities are becoming more frequent. Educators reported a substantial increase in collaborative and connective elements that help students connect with content among various contexts.

Technology use among student groupings

Educators were asked to self-report the student groupings present when using technology throughout the year. While all student groups present when using technology increased for the treatment group (most likely due to the increased use of technology), the control group also experienced increases for most student grouping types. The treatment group indicated the highest increase in the presence of small groups (41.7% increase, as compared to 22.9% increase for the control group). Whole class and partner groupings also increased for the treatment group (19.1% increase and 28.6% increase, respectively), as compared to slightly lower increases for the control group (5.1% increase and 18.7% increase, respectively); however, independent work increased nearly identically for the treatment (27.6% increase) and control groups (25.4% increase; see Figure 21 below, and Figure 85 in Appendix 6 for control group figure).

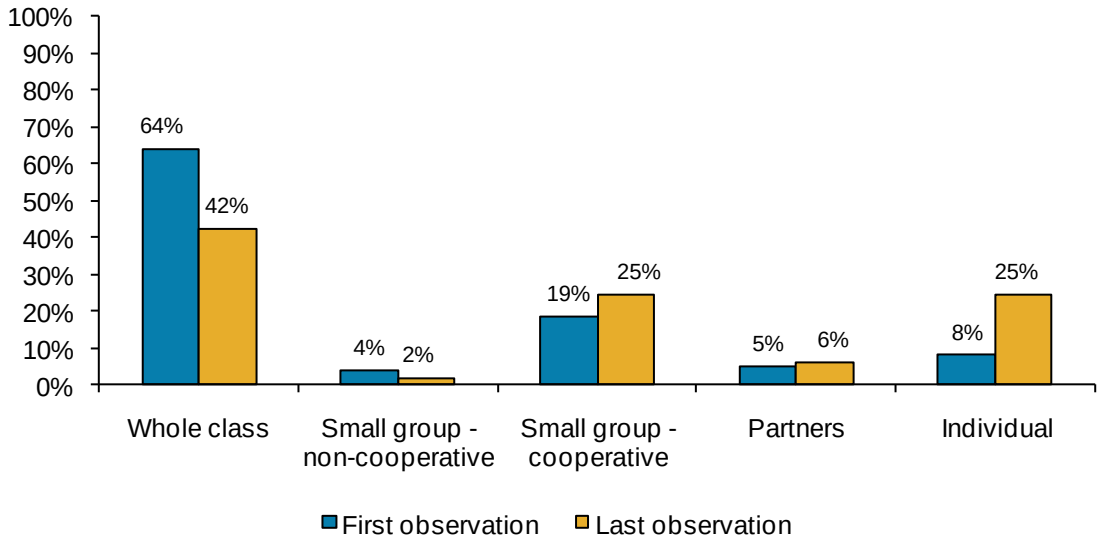
Figure 21. Student groupings present when using technology (treatment)*



*The number of responses ranged from 59 to 65 due to missing data.

In contrast to self-reported data, classroom observations of teachers implementing ARRA technology showed that the amount of whole class groupings dropped from 63.9 percent from first observation to 42.3 at the last observation. However, similar to self-reported data, individual as a grouping structure increased (from 8.1% to 24.7%; Figure 22).

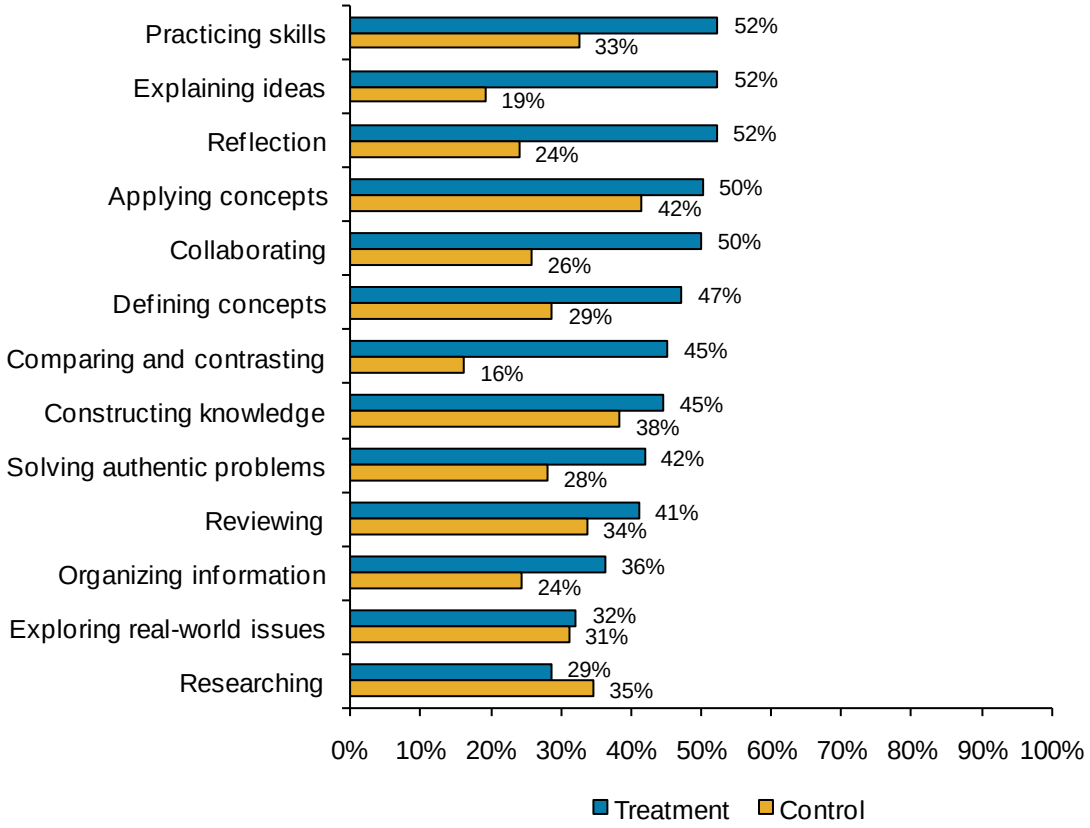
Figure 22. Primary class grouping structure (treatment; n=97)



Tech applications promoting collaboration and connections to new content

As reported in RQ1 and 2, educators in the treatment group reported their students using technology for a variety of purposes in their classrooms, all of which occurred in increased frequency from pre- to post-implementation; however, increases were also seen with the control group. With regards to student *collaboration*, however, the treatment group increased by 50.0 percent, whereas the control group only increased by 25.8 percent. Other uses of technology by students also increased, though not all substantially when compared to the control group who also showcased large changes (see Figure 23).

Figure 23. Change in teachers' reported use of technology purposes by students (pre to post)*



*The number of responses for the treatment group ranged from 61 to 64 due to missing data, and from 31 to 36 for the control group.

Focus groups participants discussed opportunities for student collaboration and connection to new content through the use of the new technologies. As one teacher stated, "It's strange how most kids will feel much freer to discuss with their friends something that's on the screen, rather than something that's on a piece of paper […]. It leads to better collaboration among students, which is where students get most of their information anyway, for better or for worse."

Many focus group participants also emphasized the connections students were making to subject-specific content as a result of their using technology. For example, one site was in contact with students in schools in Egypt and Israel, and the students were able to learn first-hand what the students in those countries were experiencing. One administrator stated, "One of the ways that they [the students] are going to learn about the world around them is using those 21st century skills in real-life types of situations." A teacher at another site reported that the use of web tools can "bring the outside world in" for students who have not visited a particular place, for example, or can "make the learning a whole lot more dynamic, relevant, and current," according to another teacher who indicated that he/she was able to show videos from the Internet of the tsunami tragedy in Japan. Also, many teachers and administrators believed the technologies allowed teachers the opportunity to differentiate instruction and to reach different types of learners more easily. Similar sentiments were echoed in the NH Case Study Report submitted by

project managers. One administrator wrote, "With the infusion of technology, the teaching environment became more collaborative, hands-on, real-life, more attuned to the students' everyday lives."

Students were also asked to report on the number of days per week they used technology for specific tasks, including tasks that may have allowed students to connect to new content or collaborate with others (see RQ 1). Treatment students, on average, reported spending less than one day per week on tasks that may connect students to new content; for example: watching video clips online (*M*=0.98 days per week); playing educational video games (*M*=0.76); communicating with teachers or other students about schoolwork (*M*=0.64); creating files on the computer that included video, audio, or animation (*M*=0.50); communicating with experts (outside of school and family) about topics related to schoolwork (*M*=0.37); and creating or updating students' own website or blog (*M*=0.33). Treatment students did report higher uses of technology for researching a topic on the Internet (*M*=1.62 days per week), which may provide opportunities for students to connect to new content. Students reported working collaboratively with other students to create products less than 1 day per week (*M*=0.56) and sharing digital files with people outside of their school and family slightly less frequently (*M*=0.45).[23] When comparing treatment students' mean changes from Fall 2010 to Spring 2011 to control students' mean changes, no changes were statistically significant.

Students were also asked questions regarding Internet safety. In general, most treatment students felt they used the Internet safely (88.8%), followed copyright laws when using technology to complete assignments (87.3%), and felt prepared to deal with cyber bullying (81.8%). As treatment students' perceptions of Internet safety did not change from beginning of the year to end of the year, it is crucial for administrators and teachers to continue to provide all students with support in these areas.

Progress toward collaboration and connections to new content

As reported in RQ 2, the percentage of eighth graders who met the ICT competency requirement of *communication and collaboration* was just over 80 percent (81.5%) as of Spring 2011. While this is an increase of 3.9 percent from Spring 2010, it is not a substantial increase. Two additional ICT requirements that are tangentially related to student collaboration and new content (technology operations and concepts, and research and information/fluency research tools) were met by similar percentages of eighth graders (86.2% and 83.8%, respectively), though the changes from Spring 2010 to Spring 2011 were also inconsequential.

Also as reported in RQ 2, over 30 percent of classroom observations conducted involved activities that addressed the ISTE standard of *communication and collaboration* (37.5% last observation vs. 32.6% first observation). While observers reported an increase in this particular standard, the change is negligible.

[23] All means reported here reflect the Spring 2011 time period only.

RQ4: How are new technologies and resources serving students of various groups, including those with the highest need?

To examine the impact the new technologies and resources derived from the ARRA/Title II-D grant are having on student groups, schools participating in the grant were separated into two groups: schools in need of improvement (SINI) and schools not in need of improvement.[24] Of the 42 schools involved in the ARRA/Title II-D grant, 25 are SINI (see Table 28 in Appendix 6). The Educator Survey was completed by 45 treatment teachers from 17 SINIs and 20 treatment teachers from five non-SINIs.[25] While the SINI educators who completed the survey were fairly evenly distributed among the 17 schools, 15 of the 20 survey responses from non-SINIs were from a single school. We therefore caution against close reading of the non-SINI data. The Student Survey was completed by 874 treatment students from SINIs and 156 treatment students from non-SINIs. The distribution of student survey responses by school was not evenly distributed – 25.1 percent of SINI responses are from a single school and 21.8 percent of non-SINI responses are also from a single school.

Overall, SINIs were able to get early access to the majority of their designated grant resources. (In fact, SINI educators generally received the technology earlier than their non-SINI colleagues). However, *daily* use of the computers and netbooks among non-SINI students outnumbered that of students at SINIs and the latter were more likely to have to share their devices with other students. Ultimately, while both SINIs and non-SINIs began the grant with similar access to and usage of the various technologies, growth in the use of several hardware/software solutions and specific applications of the tools was slightly greater among non-SINI sites. Non-SINI students also showed the most growth in various technological capacities, though SINI students should be commended for showing notable growth across several skill areas and even closing the gap in a key foundational application, word processing. SINI students also maintained their levels of enjoyment and perceptions of utility when tapping technology for learning, compared to decreases in several related indicators among non-SINI students. Finally, grant resources appeared particularly valuable to teachers at SINIs in helping them use technology to differentiate learning, as the initial gap in perceived capacity in this area between the two groups of teachers closed by the end of the grant period.

Technology availability and classroom implementation

At the conclusion of the grant, treatment teachers reported on whether or not they received all the technology that the ARRA/Title II-D grant funded. In general, most non-SINIs and SINIs had received all of their technologies (66.7% vs. 72.7%, respectively), while the remainder had received *some* (33.3% vs. 25.0%) or *none* (2.3%, SINI only) of the technologies. However, SINIs tended to receive and begin implementing the technology sooner than non-SINIs, as 76.7

[24] "**School in Need of Improvement" —** this is the term *No Child Left Behind* uses to refer to schools receiving Title I funds that have not met state reading and math goals (AYP) for at least two years. Schools labeled "school in need of improvement" receive extra assistance to improve and students have the option to transfer to another public school, including a public charter school.

[25] In addition, the Educator Survey was completed by 21 control teachers from nine SINIs and 15 control teachers from nine non-SINIs.

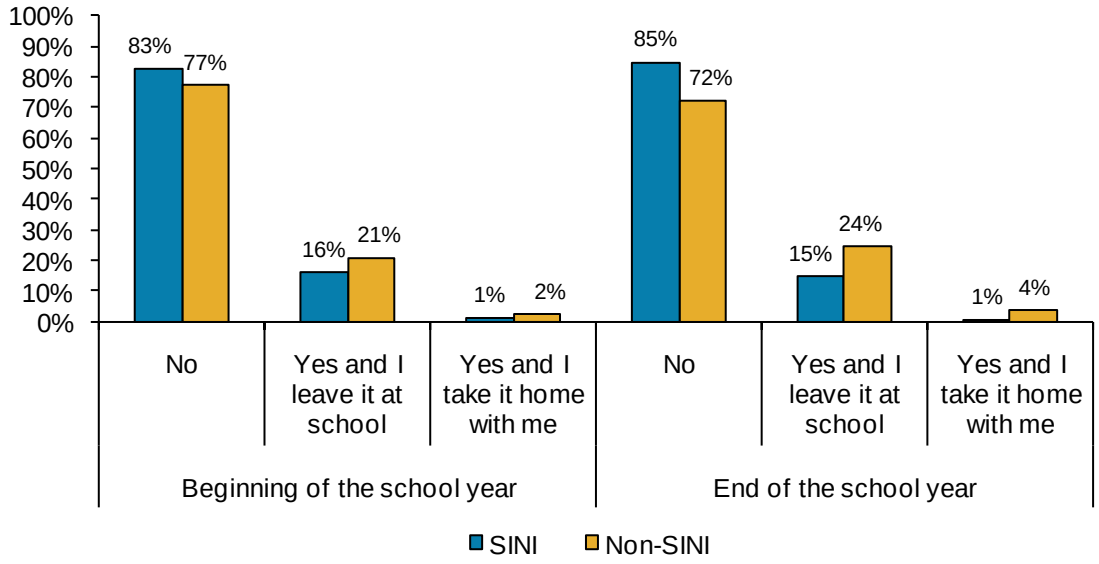
percent of educators at SINIs indicated they began implementing the technology at the end of the 2010 school year (January-June 2010), as compared to 44.4 percent of non-SINI educators.

Non-SINI educators had slightly more access to the ARRA grant technologies than SINI educators, as 88.2 percent of non-SINI educators had access for the entire grant period while 79.1 of SINI educators had the same level of access. All in all, low numbers of SINI (20.9%) and non-SINI educators (11.8%) reported having to share access to the technologies throughout the year.

Student technology usage

A gap existed between non-SINI and SINI students' computer or netbook usage, as more non-SINI students used a computer or netbook at school every day (55.8%, end of school year) than SINI students (34.2%, end of school year). These percentages remained nearly the same from the beginning to the end of the school year. SINI students also reported having to share the use of a computer or netbook slightly more frequently than non-SINI students, both at the beginning and end of the school year (see Figure 24).

Figure 24. Are you the only student who uses this computer or netbook? (treatment)



Comparing the number of days per week that students use technology for specific activities (e.g., listening, completing worksheets, writing/creating), no statistical differences were found in the average changes (beginning to end of school year) when comparing treatment students at SINIs and treatment students at non-SINIs.

When examining student use of the technology for specific tasks (e.g., create and edit papers in word processing software, watch video clips online; Table 12 in for full list of tasks), students at SINIs and non-SINIs reported similar numbers of days at the beginning of the year. While the average number of days technology was used for specific tasks generally remained the same (or

even decreased) from the beginning to end of the year for SINI students, non-SINI students showed statistically significant increases in the number of days per week they created and/or edited papers in word processing software, recorded data using software like Excel, and created files on the computer that include video, audio, or animation (see Table 16).

Students at non-SINIs also reported statistically significant changes in their average days per week using laptops and digital cameras as compared to changes for SINI students (see Table 17). The use of other technologies reported in detail in RQ 1 (e.g., desktop computers, digital projectors, netbooks) did not significantly change. Ultimately, non-SINI students appear to have experienced increases in the frequency of some specific technology-related tasks (e.g., record data using software like Excel) as a result of their increased use of particular hardware (e.g., laptops).

In general, while non-SINI and SINI students reported some similarities in frequency of use of some technologies, non-SINI students reported using some technologies more frequently than students at SINIs, both at the beginning and end of the year (e.g., interactive, laptops, desktops).

Table 16. Days per week students use technology for specific tasks (treatment)

Thinking back to your most recent *full week of school*: how many school days did you use technology at school for schoolwork to:	Group	Time of School Year	N	Average number of days	Change
Create and edit papers in word processing software, such as Microsoft Word*	SINI	Beginning	441	1.56	-0.05
		End	423	1.51	
	Non-SINI	Beginning	92	1.55	0.43
		End	92	1.98	
Record data using software like Excel*	SINI	Beginning	443	0.59	-0.15
		End	419	0.44	
	Non-SINI	Beginning	91	0.62	0.21
		End	92	0.83	
Create files on the computer that include video, audio, or animation*	SINI	Beginning	437	0.49	-0.02
		End	419	0.47	
	Non-SINI	Beginning	92	0.35	0.29
		End	91	0.64	

* Change for non-SINI students is statistically significantly greater than change for SINI students (at $p<.05$).

Table 17. Days per week students use technology for schoolwork (treatment)

Thinking back to your most recent *full week of school*: how many school days did you use technology at school for schoolwork to:	Group	Time of School Year	N	Average number of days	Change
Laptops*	SINI	Beginning	852	1.21	-0.16
		End	865	1.05	
	Non-SINI	Beginning	154	1.68	0.30
		End	154	1.98	
Digital cameras*	SINI	Beginning	861	0.43	-0.04
		End	844	0.39	
	Non-SINI	Beginning	154	0.29	0.27
		End	149	0.56	

* Change for non-SINI students is statistically significantly greater than change for SINI students (at $p<.05$).

Generally, students at SINIs and non-SINIs reported similar changes in the number of days per week technologies are used in particular subjects. The one exception is that non-SINI students had a significant decrease of an average of -0.55 days per week that technology was used in Science (M=2.12 days per week, end of the year; M=2.67 beginning of the year), while there was a minimal change for SINI students (M=2.43 days per week, end of the year; M=2.31, beginning of the year).[26]

Several technology devices were used in similar locations (or not at all) by both SINI and non-SINI students with minimal change from the beginning to the end of the school year, though some differences existed. While the use of desktop computers in computer labs changed minimally from the beginning of the year to the end of the year, slightly more SINI students than non-SINI students accessed these in computer labs (41.8% SINI, end of the year; 29.4% non-SINI, end of the year). Initially, a gap was also evident in the percentage of SINI (17.5%) and non-SINI (31.1%) students who use desktop computers most in the library or media center but this gap decreased by the end of the year (17.9% SINI; 24.2% non-SINI). Both groups typically use laptops in the classroom (54.7% SINI vs. 56.2% non-SINI, end of the school year), though a larger percentage of SINI students indicated they do not use them at all both at the beginning (36.4% vs. 18.9%) and end of the year (33.8% vs. 19.6%). Similarly, non-SINI students more frequently reported classroom access to student response systems (69.5% end of the year; 60.5% beginning) than SINI students (45.9% end of the year; 40.9% beginning). Typically, students do *not* use iPads at school, though the slight gap evident between SINI and non-SINI students' lack of usage was drastically narrowed (from 9.8 percent at the start of the year to 1.4 percent at the end of the year).

Digital projectors were overwhelmingly used in classrooms by both student groups, though SINI students (74.9% end of the school year) reported slightly higher percentages of access than non-SINI students (66.2% end of the year), with little change in each from the beginning to end of the school year. Interactive whiteboards were more prevalent in non-SINI students' classrooms

[26] t (474) = 3.07, p<0.005 (two-tailed), independent samples

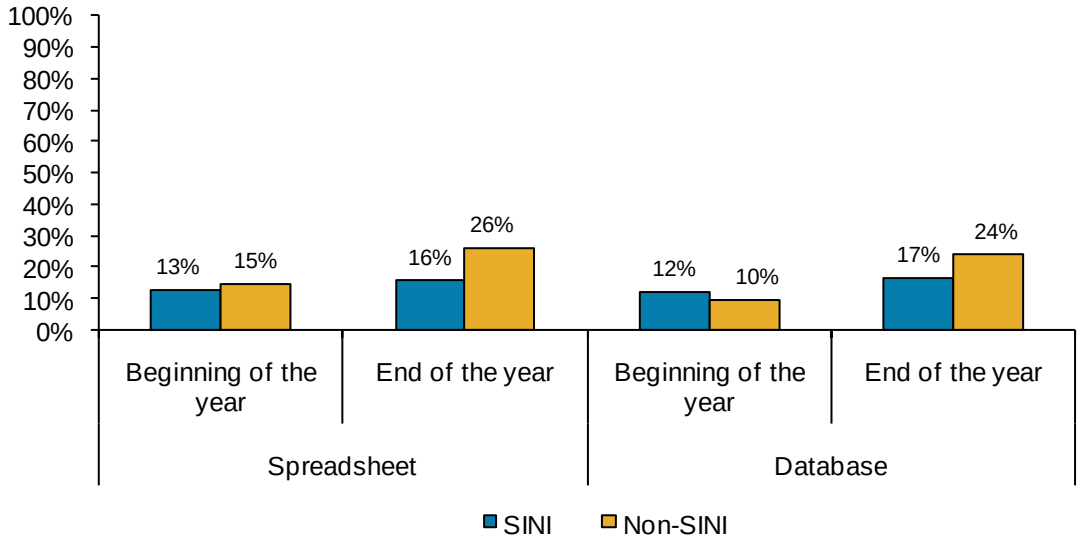
(94.1% end of the year), than SINI students' classrooms (61.3%) with virtually no change throughout the year.

These data suggest that non-SINI students may have slightly more access to some one-to-one technologies in the classroom (e.g., laptops, student response systems/clickers).

Effects on Students

In general, both SINI and non-SINI students reported similar methods to learn how to do new things with technology, with inconsequential changes from the beginning to the end of the school year. Students at SINIs and non-SINIs reported similar perceptions in their abilities to use technology, and most students only *rarely* or *sometimes* need help (78.4% SINI vs. 85.0% non-SINI, end of school year). In looking at specific activities and the amount of help needed by students, some changes were evident. The percentage of students who *rarely* need help on spreadsheets increased slightly more for non-SINI students than SINI students (11.5% increase and 2.8% increase, respectively), with 26.3 percent of non-SINI students and 15.8 percent of SINI students indicating they *rarely* need help at the end of the school year. Similarly, the percentage of students who *rarely* need help with databases increased slightly more for non-SINI students than SINI students (14.2% and 4.6% increases, respectively), with 23.9 percent of non-SINI students and 16.8 percent of SINI students indicating they *rarely* need help at the end of the school year (see Figure 25). These changes coincide with the increase in non-SINI students (over SINI students) who record data using software like Excel (as reported above), which may lead them to need less help in spreadsheets and databases.

Figure 25. Students who *rarely* need help with specific items (treatment)



SINI and non-SINI students had a gap at the beginning of the school year in the percentage that indicated they *never* need help with word processors (29.6% and 43.5%, respectively). At the end of the school year, percentages were nearly even (39.3% SINI and 41.1% non-SINI), indicating that more students in SINIs felt they needed less help with word processor tasks. Slightly more than one in four students in SINI schools (28.2%) reported *sometimes* or *rarely* needing help with digital portfolios at the start of the school year, while 33.8 percent of non-SINI

students reported the same. The percentage of SINI students in these categories changed only slightly over the year (to 33.0%) but the percentage for non-SINI students in these categories increased by a somewhat greater amount (to 41.6%).

Both SINI and non-SINI students were more likely to try to fix technology themselves if they encountered a problem at the end of the school year (37.1% SINI; 44.1% non-SINI) than at the beginning of the school year (29.2% SINI; 30.5% non-SINI), and less likely to ask an adult for help at the end of the school year (49.1% SINI; 40.8% non-SINI) than at the beginning (56.8% SINI; 56.5% non-SINI). As both groups experienced changes from the beginning to the end of the year, the grant did not have a substantial impact on SINI vs. non-SINI students' perceptions of how they will fix technology.

Students indicated their level of agreement to a series of statements regarding the use of technology. While most statements did not change from the beginning to the end of the year when comparing SINI and non-SINI students, some differences were observed. By the end of the year, the percentage of non-SINI students who *strongly agreed* that they put forth their best effort at school when using technology decreased by 13.8 percent (20.7%, end of the year), as compared with minimal change (-0.2%) for SINI students (28.3%, end of the year). Non-SINI students who agreed that they write more when using technology than with paper and pencil increased by 14.6 percent (to 26.7% at the end of the year), as compared with a smaller change (3.9%) for SINI students (to 26.3% at the end of the year).

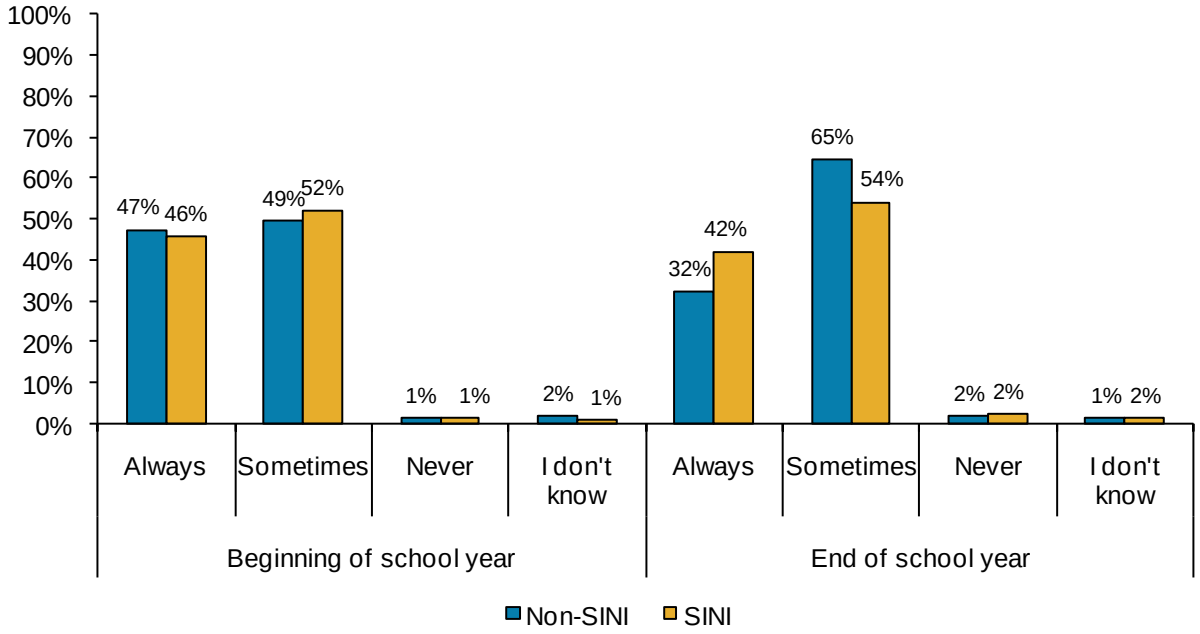
SINI students more frequently *strongly agreed* and *agreed* that it is easier for them to understand schoolwork when using technology than when using other resources and tools both at the beginning (54.0%) and end (50.7%) of the year, as compared to non-SINI students (41.3% beginning; 40.7% end). While these percentages changed minimally from the beginning to the end of the year, the stable difference indicates that the technology tools may have a more substantial impact on SINI students than non-SINI students.

One curious result was that the percentage of non-SINI students who *strongly agreed* or *agreed* that they can figure out new technology tools quickly *decreased* by 12.0 percent over the year (to 53.3%). As SINI students indicated similar percentages at both points in time, with minimal change (69.5% at end of year), non-SINI students seem to have lost some confidence in their ability to figure out technology quickly by the end of the year. This change might be a result of students' not having access to all ARRA technologies at the beginning of the school year, and therefore being very comfortable with the previously existing technology tools. As the school year progressed, students were exposed to additional technologies that they may not have encountered before, causing a shift in students' understanding of the technology tools, and an increased awareness of their own limitations.

Furthermore, the percentage of non-SINI students who *strongly agreed* that they are encouraged to be creative when using technology at school decreased by 12.5 percent to 24.4 percent at the end of the year, as compared to a 3.9 percent decrease for SINI students (to 28.6%, end of the year). However, the percentage of non-SINI students who *agreed* with the statement increased by 14.8 percent (to 32.2%, end of the year), as compared to a negligible change in SINI students of 0.9 percent (to 32.7%, end of the year). As SINI and non-SINI student perceptions were

slightly uneven for these categories at the beginning of the year, the change results in SINIs and non-SINIs feeling that they are equally encouraged to be creative when using technology at school. A decrease (12.0%) was also evident in non-SINI students who *strongly agreed* they enjoy participating in classes when using technology (21.7%, end of the year), as compared to -3.7 percent change for SINI (31.9%, end of the year). While both non-SINI and SINI students provided similar opinions of how fun technology is at the beginning of the year, non-SINI schools actually decreased in the percentage of students who feel technology *always* makes learning fun (-15.1% change), while SINI students remained about the same (see Figure 26). This may be a result of the systemization of technology; as the technology becomes much more of a standard procedure, students may feel it has lost some novelty or fun factor. In conclusion, non-SINI students reported decreases in enjoyment and the amount they are encouraged to be creative from the beginning to the end of the year, while SINI students indicated less notable changes.

Figure 26. Technology makes learning fun (treatment)*



*The number of responses ranged from 155 to 156 for non-SINI and 858 to 869 for SINI.

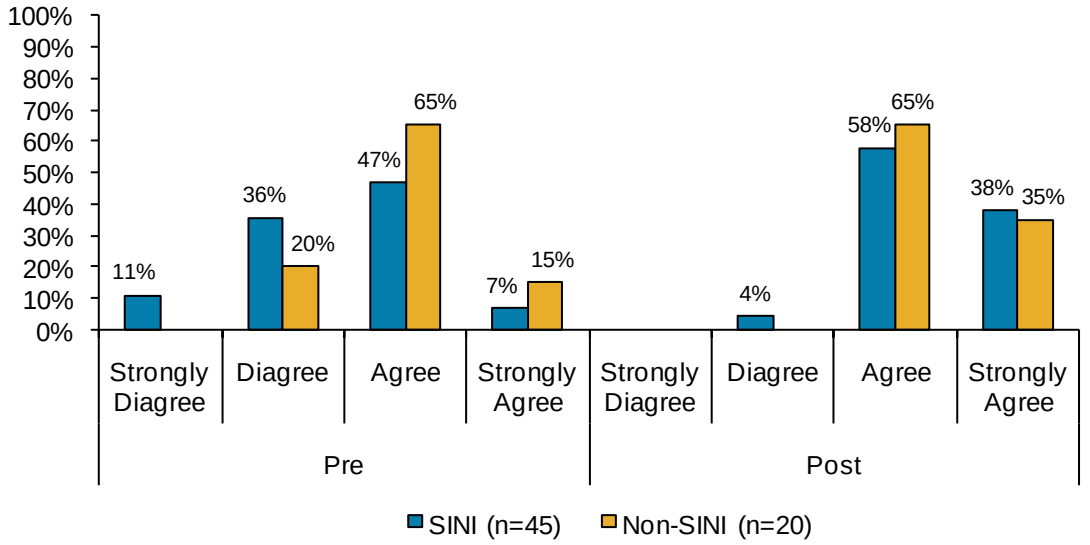
Both non-SINI and SINI students reported similar perceptions of using computers for schoolwork rather than paper and pencil and enjoyment of being at school when using technology (54.5% SINI; 48.9% non-SINI). Both groups also had similar proportions of students who felt that they learned new technology skills as a result of having access to the new technology (64.2% SINI; 69.4% non-SINI).

Both SINI and non-SINI students felt they use the Internet safely (89.3% SINI, end of year; 86.8% non-SINI, end of year), follow copyright laws when using technology to complete assignments (87.1% SINI end of year; 88.0% non-SINI, end of year), and are prepared to deal with cyber bullying (80.7% SINI, end of year; 87.0% non-SINI, end of year), with minimal changes from beginning to end of the year.

Utilizing digital tools to meet individual student needs

By the end of the ARRA grant, nearly all treatment teachers indicated they were able to use digital tools to personalize learning, with an increase of 52.2 percent for SINI educators (95.6%, end of the year) and 20 percent for non-SINI educators (100.0%, end of the year). This indicates that for SINIs, the ARRA grant drastically increased educators' perceptions of their ability to personalize learning activities using digital tools (see Figures 27).

Figure 27. I am able to use digital tools to personalize learning activities to meet individual student needs (treatment)



Of the 19 ARRA/Title II-D sites that participated in focus groups, eight are districts in need of improvement. Both in need and not in need sites reported similar implementation successes and challenges and both also cited differentiation of instruction as one of the most effective uses of technology in the classroom. One SINI teacher remarked that using an intervention math program with technology "allowed me the opportunity to provide students with a truly differentiated class. I wouldn't have been able to offer them the same sort of material across the board for every student had I had to come up with that on my own. There's just not enough time in the day." Other teachers from SINI and non-SINI sites echoed this one teacher's remarks, and many indicated that the technology offers the ability to reach different types of learners in new ways. One SINI administrator also stated that technology "levels the playing field" for students, especially for those who are otherwise not as skilled at writing, test taking, or reading.

Similarly, several SINI and non-SINI project managers completing the NH Case Study Report cited differentiation of instruction as an effective teaching approach that impacted students. As a non-SINI project manager wrote, "This program emphasized how 1:1 technology can help differentiate instruction so we can help each child meet and surpass his/her academic needs. Teachers were able to bring learning to a personal level, find ways to allow students to continue learning outside of the usual class time, and address areas of concern for the school overall."

A few sites in the Spring 2011 focus groups also reported fewer behavioral issues throughout the year, which was credited to the students' interactions with technologies. Teachers and administrators indicated that students are more engaged and focused when using technology and one SINI teacher stated, "I find that I'm not refocusing my group as much as I was during whole-lesson instruction, so it allows for greater learning because I'm not stopping my class to talk to them as much."

RQ5: How are grantees doing in terms of training teachers not only how to use technology but also how to translate their new skills into practice in their teaching?

ARRA grantees tapped a variety of professional development sources and modalities to deliver professional development concurrent with their ICT integration efforts. As is typical when rolling out a series of innovations, educators' training needs varied over time, as participants made gains in several areas and shifted their developmental priorities throughout the life of the grant. We will see below that educators have identified specific next steps they want in their technology integration (e.g., alignment with core curricula, improvements in student literacy skills, utilization of data analyses, and optimization of whiteboards) as they continue to establish a foundational framework for classroom and school-wide usage.

Participation in Training Activities

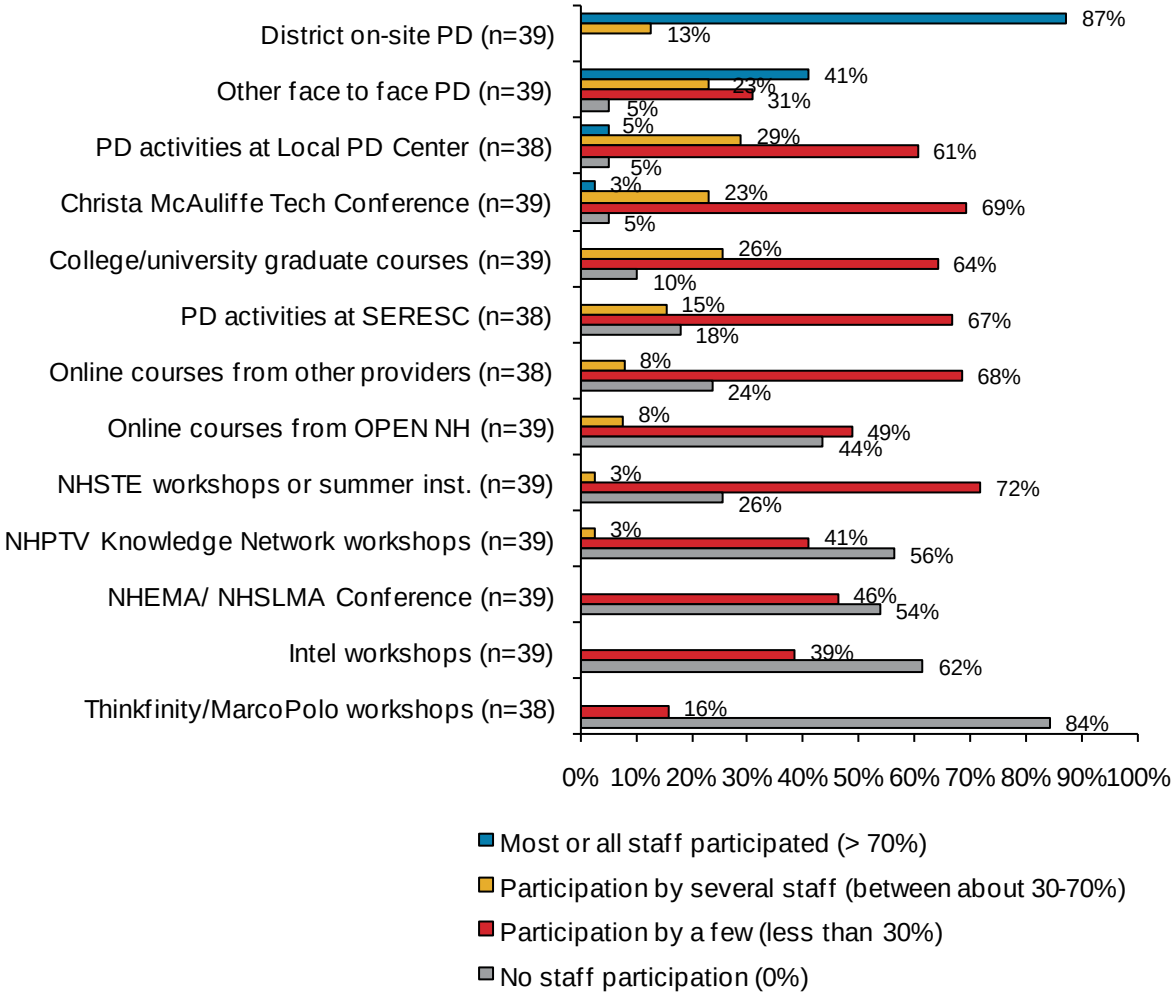
Teachers and administrators were asked to provide insight on the training and professional development provided throughout the ARRA grant. During the Spring 2011 focus groups, administrators and teachers indicated that most professional development was provided by in-house staff members (e.g., technology integrators, library/media specialists), external consultants, or equipment vendors (e.g., Promethean, Smart Board). Some focus group participants also identified attending conferences and online courses or webinars as additional sources of training.

Nearly all administrators (87.2%) reported that most or all staff in their school participated in district on-site professional development during the 2010-11 school year, an increase of 18 percent from the 2009-10 school year. Some administrators also reported that less than 30 percent of their staff participated in the Christa McAuliffe Tech Conference (69.2%), online courses from providers other than OPEN NH (68.4%), or college/university graduate courses (64.1%).

As compared to the 2009-10 school year, more teachers attended New Hampshire Public Television (NHPTV) Knowledge Network workshops (14.7% increase in participation), the New Hampshire Educational Media / New Hampshire School Library Media Association (NHEMA/NHSLMA) conference (10.3% increase), and the Christa McAuliffe Tech Conference (5.2% increase) in the 2010-11 school year. Less teachers are participating in Intel workshops in the 2010-11 school year (14.1% decrease in participation), and in online courses from OPEN NH (10.3% decrease), though more teachers are participating in online courses from other providers

(1.22% increase; see Figures 28 below and Figure 86 in Appendix 6 for 2009-10 percentages). [27] It is important to note that the activities listed below represent school-wide participation in professional development, and not just those professional development activities specific to ARRA participation.

Figure 28. Staff participation in professional development or training for 2010-11 school year (treatment)

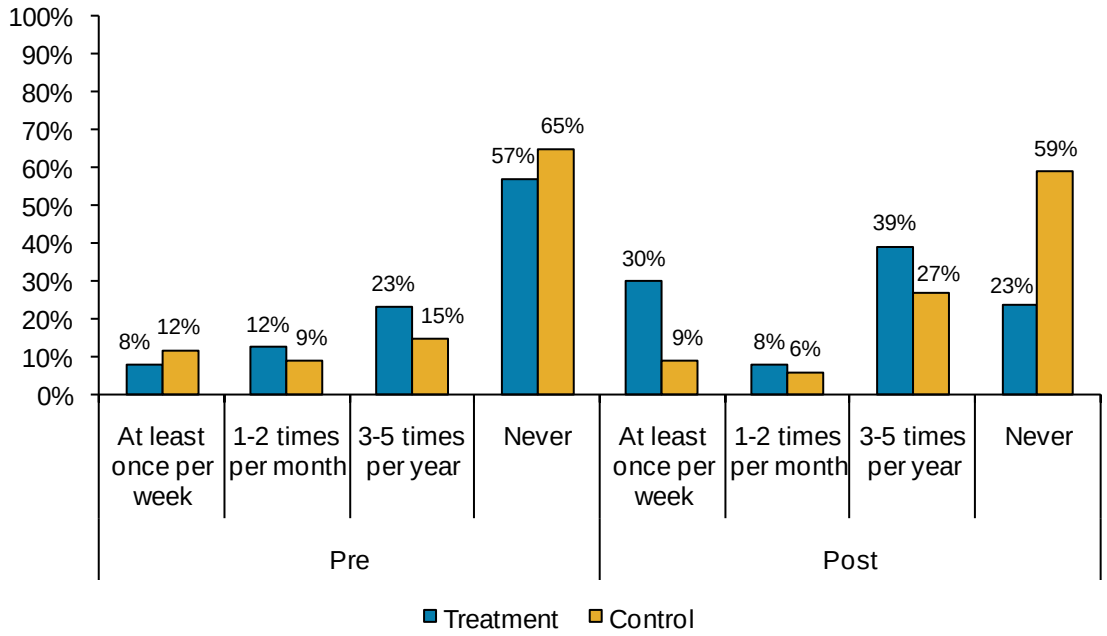


Teachers reflected on their participation in online learning communities (OLC) for professional development. Data from the Educator Survey show that the frequency of participation in OLCs by treatment teachers increased 33.5 percent from pre to post, with the percentage of teachers who reported never engaging in OLCs decreasing by the same percentage. In contrast, the frequency of participation in OLCs by control teachers only increased 5.9 percent. Also, the treatment group reported increases in the percentage of educators who participate in OLCs daily

[27] Participation increase/decrease calculated by the difference between "No staff participation" in 2010-11 and "No staff participation" in 2009-10.

(increase from 1.5% to 12.5%) and once per week (increase from 3.1% to 14.1%), for a total increase across those who participate at least once per week (combine categories of: daily; 2-4 times per week; and once per week) of 22 percent (see Figure 29).

Figure 29. Frequency of teacher participation in online learning communities for professional development*



*n's range from 64 to 65 for the treatment group, and were 34 for each time for the control group. Also, "at least once per week" combines the categories of "daily," "2-4 times per week," and "once per week."

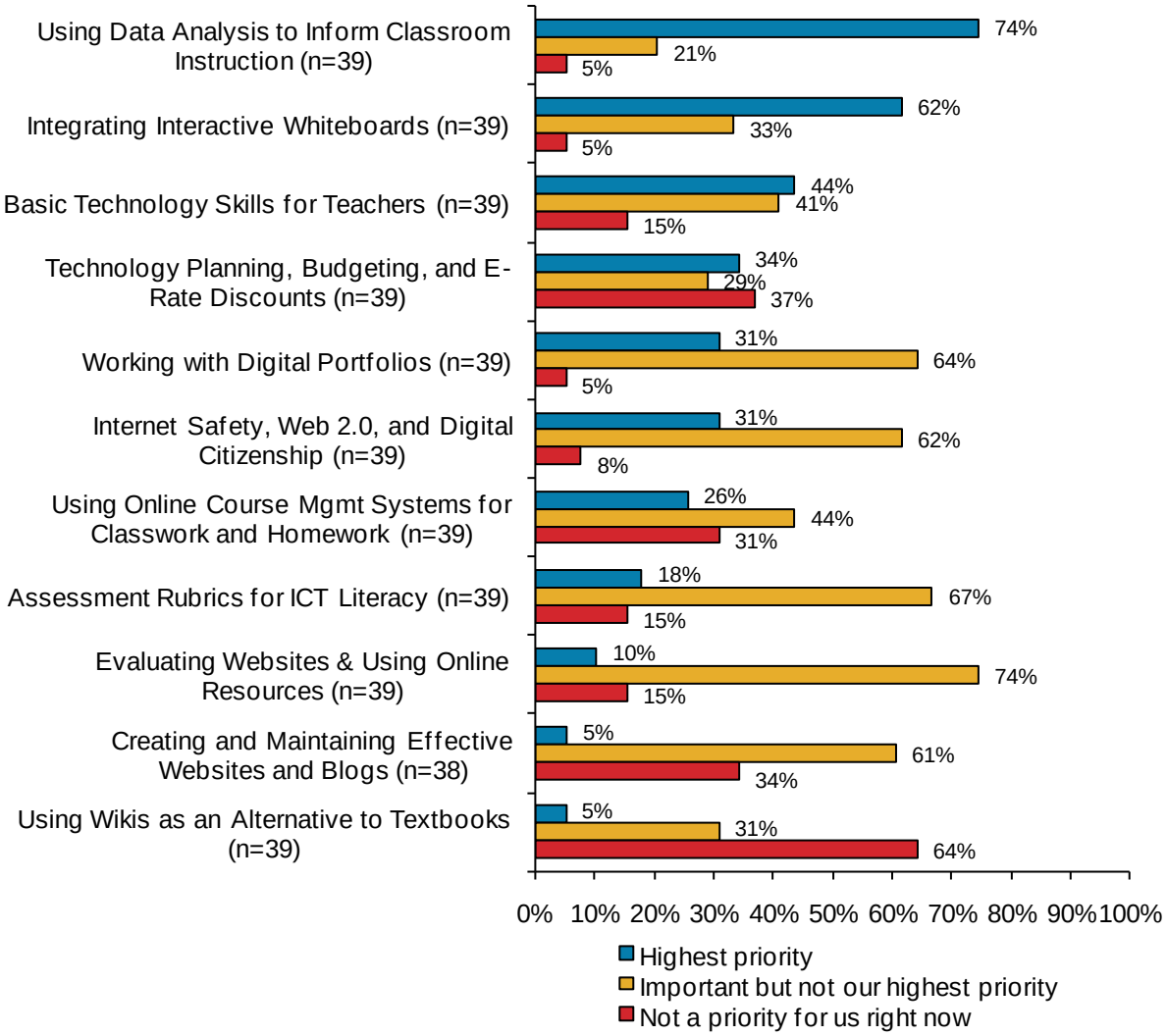
Professional Development Content and Teachers' Training Needs

When asked to rate the importance of various technology professional development topics for their school, administrators indicated in both Spring 2010 and Spring 2011 that the *highest* priorities are using data analysis to inform classroom instruction and integrating interactive whiteboards, while using wikis as an alternative to textbooks was rated by most administrators as "not a priority." Administrators reported an increase in basic technology skills as the *highest priority* (12.8% increase) and Internet safety (12.9% increase). Administrators more frequently reported the assessment of rubrics for ICT literacy to be *important* (though not the highest priority) in Spring 2011 than in Spring 2010. Administrators were nearly evenly split on the importance of technology planning, budgeting, and E-Rate discounts in Spring 2011, while more administrators viewed it as *important* in Spring 2010. Also, the importance of working with digital portfolios as a *highest* priority decreased slightly (-10.2%; see Figure 30 and Figure 87 in Appendix 6).

Most of the topics administrators rated highly on the list involved direct implementation and effective use of the technology (e.g., using data analysis to inform classroom instruction, integrating interactive whiteboards, basic technology skills for teachers). In contrast, most topics that received mid-range or low overall priority ratings involved longer-term integration or novelty applications (e.g., using wikis, creating and maintaining websites and blogs, using online

course management systems). In general, this remains true for both Spring 2010 and Spring 2011 data collection points.

Figure 30. Teachers' need for professional development of technology topics (Spring 2011; treatment)



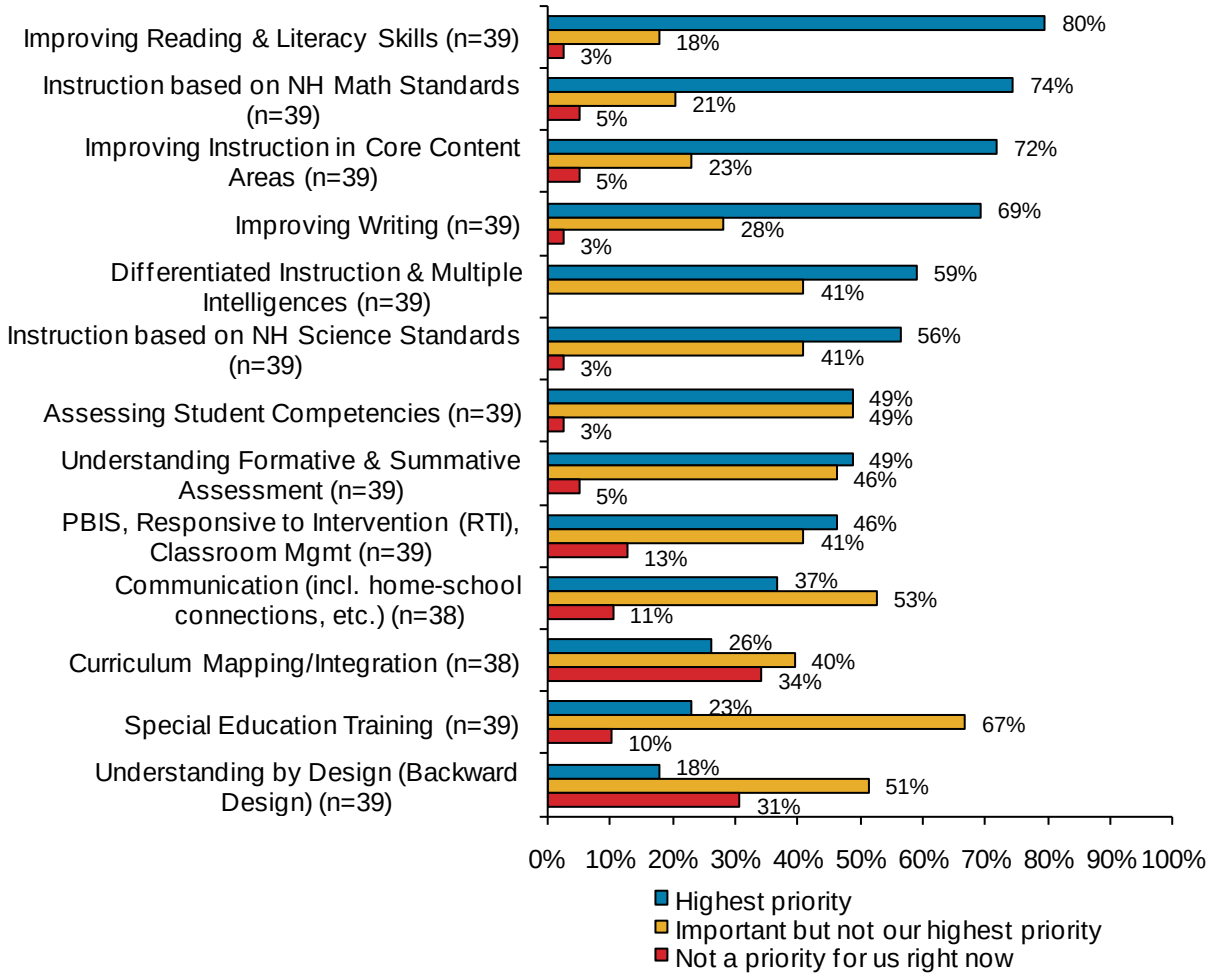
In considering professional development topics outside of technology, administrators rated improving reading and literacy skills, improving writing, and improving instruction based on NH Math Standards as the *highest* priorities in both Spring 2010 and Spring 2011. Topics that increased in priority from Spring 2010 to Spring 2011 included improving instruction in core content areas, instruction based on NH science standards, improving writing, and improving reading and literacy (see Figure 31 below, and Figure 88 in Appendix 6 for 2009-10 percentages).

Additionally, when comparing data from Spring 2010 to Spring 2011, more administrators felt Curriculum Mapping/Integration is *not* a priority (15.8% in Spring 2010 and 34.2% in Spring 2011). No administrators indicated that differentiating instruction is *not* a priority in Spring

2011 (in contrast to 10.5% in 2010), and the percentage of those that reported it as the highest priority increased from 44.7 to 59.0.

Figure 31 below show that most topics that administrators rated as *highest* priority include content-based training (e.g., improving reading and literacy, improving writing, improving instruction in core content areas) and curriculum- or assessment-based training items (e.g., assessing student competencies, understanding formative and summative assessment, curriculum mapping/integration, and understanding by design) were generally rated lower. This is true for both Spring 2010 and Spring 2011 and suggests that administrators' priorities for professional development align closely with the need to increase students' reading, writing, and mathematics skills.

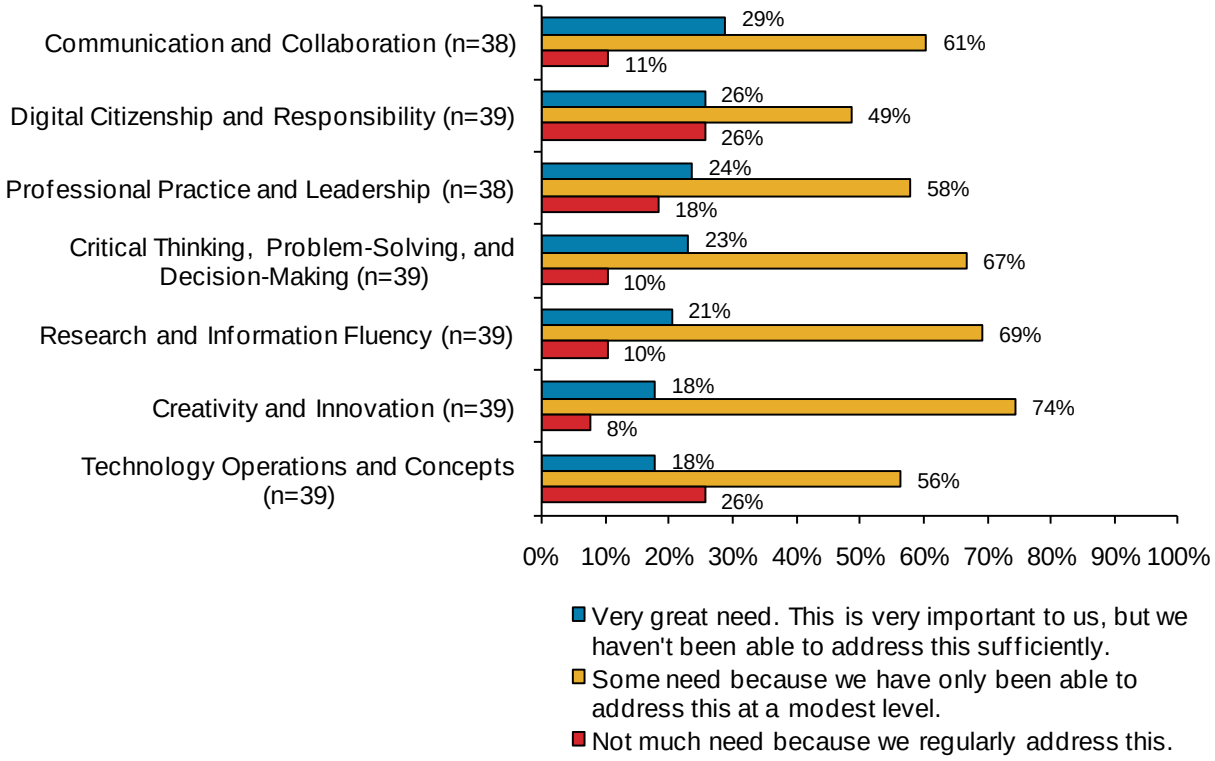
Figure 31. Teachers' need for professional development of non-technology topics (Spring 2011; treatment)



Administrators were also asked to indicate their perception of teachers' level of training need within each ISTE NETS-T content area. In general, the majority of administrators feel they have *some need* in each content area, with lower percentages of administrators indicating *very great*

need and *not much need*. When comparing responses from Spring 2010 to Spring 2011, less administrators indicated they have *very great need* to address certain categories in Spring 2011 than in Spring 2010 (i.e., Research and Information Fluency; Critical Thinking, Problem-Solving, and Decision-Making; Technology Operations and Concepts; Professional Practice and Leadership). These shifts may be the results of increased professional development (from pre to post) that addressed some of these issues, leading administrators to indicate less immediate needs for certain content area trainings (see Figure 32 below, and Figure 89 in Appendix 6). According to administrators' average rating on the NH STaR Chart, however, educators' technology competencies (or capabilities) are *developing* in this area (*M*=2.58 out of 4, post).

Figure 32. Teachers' need for professional development in NETS-T content areas (Spring 2011; treatment)



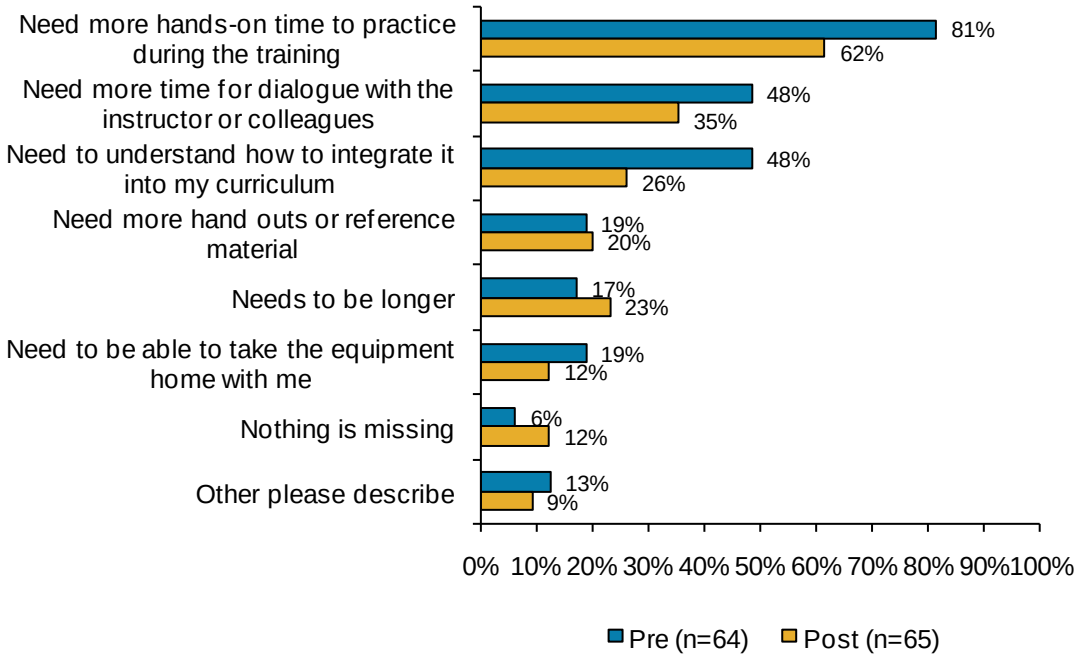
On average, districts are nearing *proficient* levels (*M*=2.95 out of 4, post) with regards to their content of professional development trainings, according to ratings on the NH STaR Chart. Also, districts used a model of professional development that was *developing*, as identified in the NH STaR Chart (*M*=2.68 out of 4, post; *M*=2.46, pre).[28]

When asked what aspects of training are missing from the current professional development opportunities being offered through the ARRA/Title II-D grant, the most common response was the need for more hands-on time to practice during training (61.5%), though the percentage of

[28] This change was not statistically significant; t (18) = 0.95, p>0.05 (two-tailed), paired samples

those reporting this for the pre survey was higher (80.7%) than the post. In general, educators identified fewer items they feel are missing from current trainings at the conclusion of the project (see Figure 33).

Figure 33. What aspects of training do you feel are missing from current trainings? (treatment)



Training Challenges

Variations across sites in the receipt, inventory, and installation of technology affected the timing of professional development and implementation for some schools. During the Spring 2011 focus groups, some teachers and administrators identified time constraints (including lack of time to learn, plan, share, and attend professional development) as one barrier to the successful implementation of the ARRA grant. As one teacher stated, "I feel that people are getting sick of hearing us say to them, 'Time. We don't have enough time.' But we don't." However, it is also important to recognize that 89.7 percent of administrator respondents to the Spring 2011 School ICT Literacy/Professional Development survey (and a similar percentage in Spring 2010) reported that their school provides teachers with time during regular school hours for learning and professional development growth opportunities. As teachers continue to learn how to integrate the technology into the classroom, time for professional development is crucial to help them become comfortable with the technology and use it to its maximum potential.

Sustainability for Continued Technology Integration

ARRA grantees were asked several questions regarding program sustainability beyond the conclusion of the ARRA grant. With regards to a district technology plan, districts are *developing* in their *vision and planning*, according to administrators' ratings on the NH STaR Chart (*M*=2.82 out of 4, post). Educators were also asked about sustainability plans to allow for continued implementation of instructional technology and training once the ARRA grant period has ended in both the focus groups and Educator Survey.

According to respondents to the Educator Survey, most treatment teachers (62.5%) did not know if there was a sustainability plan in place, and approximately one third of treatment teachers did know about a plan (31.2%). When asked to elaborate on their school/district sustainability plan (if known) on the Educator Survey, some cited their state-mandated district technology plan, while some other respondents indicated that their district has a technology committee for general meetings to discuss such plans. Some educators indicated that professional development or technology implementation will continue as a result of district support, but did not provide additional details. One educator wrote, "We are always providing opportunities for staff to attend technology professional development. We have embraced technology for decades and will continue to do so as we strongly believe in the benefits of instruction through this medium."

ARRA project managers appeared more knowledgeable on this topic, and most indicated on the NH Case Study Report that there are plans for continued use of technology, continued professional development, and that teachers will continue to support one another (e.g., by training other teachers). About half of project managers indicated that there is funding allocated for more technology integration or that more hardware/software has been or will be purchased. Similarly, during the focus groups, most sites indicated there is a sustainability plan in place, however, details of these plans were unclear. Some cited the NH State Technology plan as their sustainability plan, while others were either unaware of the details or did not provide them. A very small number of sites indicated no specific sustainability plans or their plans are limited by budget constraints.

ARRA project managers also elaborated on plans to disseminate information on project impacts. Primarily, project managers identified sharing information through the school website, newsletters, conferences, local media, and through general sharing with stakeholders (e.g., at school board meetings).

2. Conclusions

The section that follows presents conclusions based upon the interpretation of findings across the five research questions.

RQ1: How well are school staff members turning classrooms into technology-rich learning environments, fully equipped with hardware, software, and rich digital resources for learning?

Across the ARRA grant program, educators employed a variety of emerging technologies. As a result, they expanded their instructional approaches to include more constructivist and student-centered activities, such as writing/creating, researching and collaborating. The increase in these

applications is likely an effect of the teachers' increased comfort with technology, as the percentage of teachers who generally feel comfortable using the resources in their classrooms jumped from 75.4 percent prior to the grant to 98.4 percent by the end of the initiative.

With the increased availability of technology, it is not surprising that teachers reported substantial increases in student use of technologies for learning purposes and activities. However, student data showed more modest changes, with the use of desktop computers, netbooks, and digital projectors the only technologies for which there were significantly larger increases in use when compared to the control group.

Districts utilized various support personnel and solutions to address initial and ongoing maintenance needs. However, they reported that they could use more readily available personnel for curricular integration. In addition to delays in deployment, other challenges to properly equipping educators' learning environments included residual connectivity and compatibility issues; varying degrees of experience and comfort with technology at the start of the grant; and lack of time for professional development and to learn, plan, and share around the resources.

Despite these challenges, educators had positive outlooks on the potential for using technology to improve student learning and instructional effectiveness. Teachers reported increasingly positive perceptions regarding the time it takes to plan lessons that use technology, though more than half still had reservations at the end of the grant period about the time it takes to plan instruction around the technology. Teachers collaborated and shared ideas with their colleagues more often as the grant progressed and they widely believed that their administrators are interested in their use of the resources with students.

RQ2: To what degree are these technology-rich settings encouraging mediating outcomes for students, including interactive learning, higher-level thinking skills, and student engagement?

Educators reported increased student engagement, motivation, and concentration as a result of the ARRA grant. While changes in student perceptions were not as notable, many students reported being more interested in schoolwork when using technology than when using other resources. Also, administrators and teachers reported that technology readily contributed to student learning and skill-building, including higher-order thinking and real-world skills; however, only a few sites were able to articulate tangible gains in student achievement.

Teachers also reported that the technology contributed to their own skills as educators to address various areas of student learning, particularly among different types of learners. However, while teachers increased their use of several types of technology applications, a noteworthy number of teachers devoted resources to more solitary instructional activities (i.e., worksheets, assessments, practice/drills). Walkthrough observation data confirmed that students' cognitive levels were most often *understanding* and *application*, with small increases in more advanced cognitive levels in student learning. Nevertheless, schools reported that students were largely meeting various ICT competencies that address higher-order applications of the resources (e.g., creativity, collaboration, critical thinking).

As several administrators and teachers discussed delays of equipment, technical difficulties, and the need for additional time to learn the technologies, effects on students may be more prevalent in the 2011-12 school year. Because of the potential barriers identified and the short project timelines, several sites indicated plans for reviewing student data (e.g., standardized test scores) in future years to track progress and impact.

RQ3: To what degree does the provision of technology tools translate into real opportunities for students to collaborate and connect with new content?

Classroom opportunities for student collaboration around the technology resources (e.g., small groups, pairs) increased notably among grant teachers' self-reported activities. The frequency of technology activities that engaged students in collaborative applications increased by half over the course of the year, and other individual and whole-class/teacher-led applications of technology were also reported as occurring regularly.

Educators provided anecdotal evidence of students utilizing technology-enabled collaborative modalities and real-world connections to connect with new content. The technology enabled students to learn from each other, students in other countries, and current/relevant information from around the globe to "bring the outside world in" and add a dynamic element to their learning experiences.

RQ4: How are new technologies and resources serving students of various groups, including those with the highest need?

Early accessibility of grant resources among schools in need of improvement (SINI) appeared sufficient and comparable to non-SINI sites, and SINI schools often received the technology even earlier than non-SINI buildings.

Nevertheless, non-SINI students generally had greater access to – and more frequent use of – several resources, including hardware devices (e.g., laptops, digital cameras) and software applications (e.g., creating multimedia files, creating/editing word processing documents, using Excel to record data). However, while students at non-SINI schools concluded the grant period with generally higher technology proficiencies in several areas (perhaps as a result of greater access to hardware/software solutions), SINI and non-SINI students both showed growth in these capacities, and SINI students closed a gap in word processing abilities by the end of the year.

By the end of the grant period, non-SINI students reported being less confident in their abilities to figure out the technology quickly. As the majority of non-SINI schools were not implementing technologies by the end of the 2009-10 school, this decrease may be a result of students not having access to the new technologies at the beginning of the school year and being initially comfortable with the existing tools. After being introduced to new technologies in the 2010-11 school year, non-SINI students' confidence may have decreased.

Also, non-SINI students reported decreases in enjoyment and the amount they are encouraged to be creative, which may be a result of the normalization of technology, resulting in the loss of some novelty or fun factor. Interestingly, SINI students reported less noteworthy changes in their enjoyment of technology. Also, SINI students were much more likely than their non-SINI

peers to find schoolwork easier to understand when using technology. This suggests that the tools may have a more meaningful impact on students in these SINIs than in these non-SINIs.

Grant resources were particularly valuable to SINI teachers in their use of technology to personalize learning activities and meet individual student needs, as the initial gap in perceived capacity in this area between the SINI and non-SINI teacher cohorts had closed by the end of the grant period. Ultimately, improved differentiated learning was a grant outcome lauded by participants in both groups.

RQ5: How are grantees doing in terms of training teachers not only how to use technology but also how to translate their new skills into practice in their teaching?

District on-site professional development sessions remained the predominant training source for the majority of participants, who reported that content was typically delivered by in-house staff members (e.g., technology integrators, library/media specialists). In some cases, external consultants and equipment vendors (e.g., Promethean, Smart Board) were also brought in to lead workshops.

Online learning communities (OLCs) for professional development were used by ARRA educators far more readily than among non-participating teachers, indicating an emphasis on a community of practice among those integrating the grant resources.

Educators cited time as a considerable area of need – time to learn about, plan around, experiment with, and share tech-enabled practices and strategies. Also, over 74 percent of administrators reported *some* or *very great need* to address ISTE NETS-T areas for further teacher professional development. Training specific to core content areas, data analysis, and the optimization of interactive whiteboards also remained priorities for further development.

B. Classroom Technology Mini-Grants

1. Findings By Research Question

RQ1: How well are school staff members turning classrooms into technology-rich learning environments, fully equipped with hardware, software, and rich digital resources for learning?

Mini-Grant recipients employed a variety of methods to support teachers' use of technology. Following project implementation, educators reported increased confidence and abilities to optimize their use of the technologies, as well as increased student use. Educators reported positive school cultures that provide teachers with opportunities for continued integration of technology into all areas of teaching and learning.

District-Level Support and Infrastructure

The District Technology Survey was completed by 35 Mini-Grant recipients/districts in Spring 2011. Evident by the responses provided on the instrument, the technical provisions and infrastructure capabilities varies greatly among the districts.

Districts relied on numerous Internet service providers, most frequently *Comcast* (37.1%), *Destek* (17.1%), *Metrocast* (17.1%), *Time Warner* (17.1%), or other service providers (17.1%). Nearly three quarters of districts that received a Mini-Grant (71.4%) had a full T1/ATM or greater of bandwidth, followed by 25.7 percent with ISDN DSL broadband/cable. Districts also reported Internet access and provisions on the NH STaR Chart, and districts reported high levels of LAN/WAN connectivity (*M*=2.97 out of 4) and overall access (*M*=3.21 out of 4).

Districts that received a Mini-Grant reported various types of Internet filtering software programs, with *iPrism* (29.4%) and *Sonic wall* (23.5%) most often cited, though several districts indicated they use other filtering software (41.2%). More than half of the respondents (58.8%) spent less than five hours per month on filter maintenance and on block/unblock requests. Over sixty percent (61.8%) retained their filter log files for 30 days or less, and 38.2 percent of districts retained log files for 31 or more days. According to NH STaR Chart responses, districts were *proficient* **(***M*=3.38 out of 4) in their technology security.

All districts used a library automation system, and over half (63.6%) used *Follett*. On the contrary, 64.7 percent of districts reported no district-wide curriculum-mapping software, though 20.6 percent of districts indicated using *TechPaths* to map curriculum.

Over half (65.7%) of Mini-Grant recipients expected teachers to use their school or district email address as a primary school communication tool, though only 34.3 percent had a policy to enforce this. Districts reported using a wide variety of email solutions, though *MS Outlook* was the most common. Time spent per month on email maintenance varied, though districts frequently reported five to eight hours a month (32.4%) and five hours or less a month (29.4%).

Sixty percent of districts employed a full time district-level technology coordinator position to handle hardware maintenance, and 54.3 percent also had a full-time district-level technology coordinator to handle software applications. A smaller percentage of districts employed a full-time coordinator to support 21st century learning technology (38.2%), and 29.4 percent indicated they pay an IT company or individual to provide this support. Most of the time, technology coordinators for hardware and software maintenance, and 21st century learning served multiple building within the district (65.7%, 71.4%, and 70.6%, respectively).[29] On the whole, Mini-Grant districts rated their availability of a technology integration specialist as *developing* (*M*=2.15 out of 4) on the NH STaR Chart, as well as their technical support (*M*=2.50 out of 4).

Table 18 below presents the total amounts budgeted for technology spending among the districts for the 2009-10, 2010-11 and 2011-12 school years. Average technology budgets increased, as did the maximum amount of money allocated for technology. Also, districts rated their budget levels (*M*=2.44 out of 4) and allocation of funds per student (*M*=2.00 out of 4) as *developing* on the NH STaR Chart.

[29] Districts could select more than one response for all items discussed in this paragraph.

Table 18. Locally budgeted amounts for district technology (District Tech Survey)

School year	N (districts)	Min	Max	Mean
2009-10	34	$8,000	$1,071,000	$263,620
2010-11	34	$8,000	$1,034,404	$280,744
2011-12	33	$10,000	$1,200,000	$293,300

School-Level Support and Infrastructure

The NH School Technology Access Survey was completed by 37 school buildings that received a Mini-Grant.[30]

Most schools (93.8%) reported availability of PC equipment for instructional purposes, while 63.3 percent reported having Mac equipment. Of the schools with Mac equipment, only two schools reported having more than 100 Macs, while most (66.7%) schools with PCs reported having more than 100. Many schools (77.1%) reported having thin client or netbooks, and nearly half (48.1%) of the schools with this equipment had 40 or more. On average, districts that received a Mini-Grant were *developing* in their student-to-computer ratio (*M*=2.59 out of 4).

Of the buildings that have access to mobile computer labs (89.2%), all but one school share access to the mobile labs among several classrooms. However, over half (60.6%) only have 2-3 mobile labs per building. On average, administrators rated their districts as *developing* (*M*=2.53 out of 4) in the design of instructional settings using the NH STaR Chart. Also, 73.6 percent of teachers completing the Educator Survey reported that computer labs were available when they needed them for their students.

Forty-five percent (45.0%) of schools indicated that 20 or more teachers per building were provided with desktop computers for their professional use. Over half (52.7%) indicated that 20 or more teachers per building were provide with laptop computers for professional use.

Mini-Grant recipients have access to a variety of presentation tools; however, the number of equipment pieces available per building ranges greatly. For example, all but one building reported access to LCD projectors, all but four schools reported classrooms with cable TV access, and all but one school reported access to at least one interactive whiteboard, with *Smart Board* as the most popular brand. Among digital handheld devices available, schools most frequently reported access to both digital cameras and digital video cameras. Also, over half of schools reported having access to: image scanners, digital microscopes, graphing calculators, data collection tools, and portable keyboards. While over 50 percent of schools have access to the aforementioned materials, the number available per school ranges greatly. Less than half of Mini-Grant schools reported access to: data collection interfaces, GPS, portable digital audio players, CBL's, iPods, PDA Handhelds, and Handheld game units, again the availability ranges greatly by school. Reports on the NH STaR Chart confirmed that districts, on average, had high

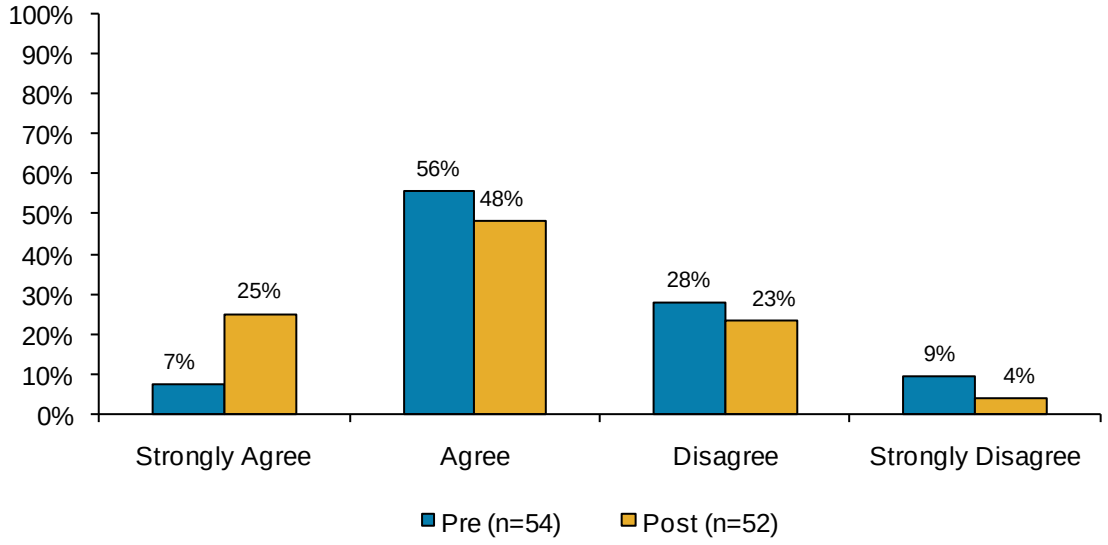
[30] Because the survey asked respondents to report on building-level conditions, only one survey was completed for two pairs of schools (the buildings were combined junior/senior high schools).

availability levels (*M*=2.85 out of 4) of technologies (e.g., TVs, DVDs, digital cameras, calculators).

In examining staff access to file storage, email accounts, and editable web pages, the vast majority (94.6%) of schools had accounts set up on the school network, though only 27.0 percent could access their files outside of school. Nearly all schools (97.3%) also provided all teachers with an email account that can be accessed both in and out of school, and 86.5 percent of schools expected that teachers use their school email address as their primary communication tool. In addition, only 35.1 percent of Mini-Grant schools expected their teachers to maintain a class webpage for parents and students to access homework and class information.

Just over three-quarters of teachers (75.5% post) felt that the technology in their school functions properly, with little change from pre- to post-project (69.1% pre); however, educators increasingly reported that they received sufficient support for successfully using technology with students (73.1% post, 63.0% pre; see Figure 34). Also, the percentage of educators who agreed that they received enough curriculum support to integrate technology into the classroom increased by 13.4 percent (74.5% post, 61.1% pre).

Figure 34. I receive enough technical support to be successful in using technology with students



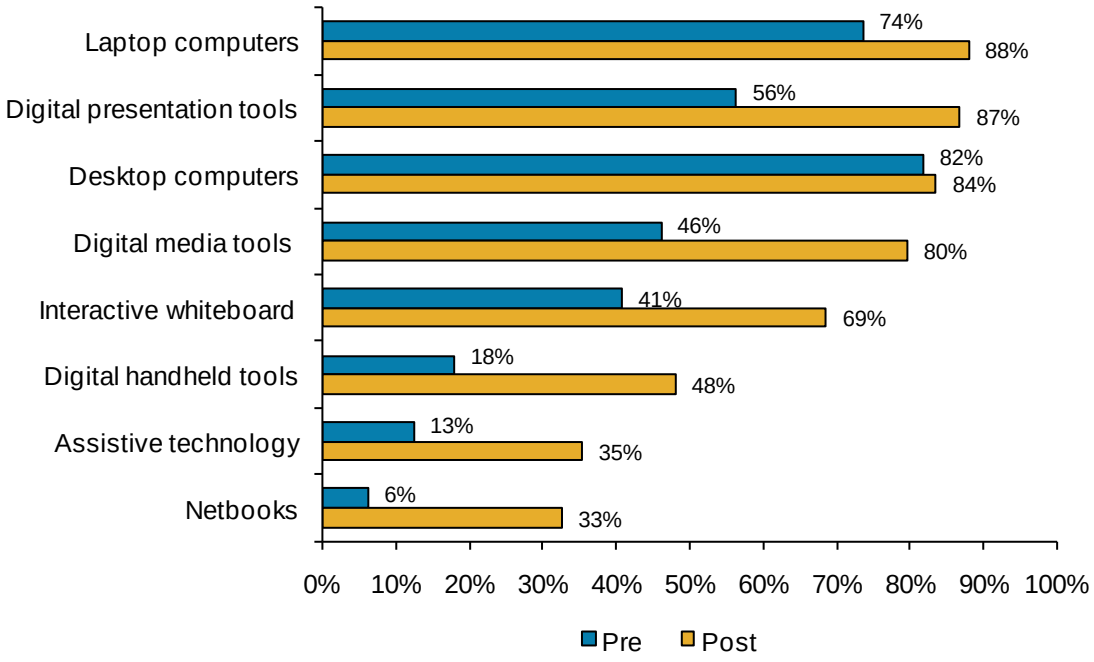
On the subject of school technology support, building administrators indicated that paid full time (61.3%) or part time staff members (32.3%) provide hardware maintenance, and software support was provided primarily by paid full time (60.6%) or part time staff (24.2%), as well as by one or more school staff members as a building technology expert who receive stipends (24.2%). Support for curriculum integration is provided primarily by paid full time staff (46.7%) or through one or more staff members who receive stipends (40.0%), and part time staff to a much lesser extent (20.0%). No respondents indicated having a student program (e.g., GenYes) provide support.

Teacher Practice

After receiving the Mini-Grant, there was a substantial increase (17.1%) in educators who used technology in their instruction with students every day (44.4% post, 27.3% pre). Another 27.8 percent were using technology in their instruction 2-4 times each week post-implementation.

While desktop and laptop computers remained a popular technology for teacher use, several other technology resources saw sharp increases in their use, as reported by teachers; most notably, teachers' use of digital media, presentation, and handheld tools, as well as interactive whiteboards and netbooks. Teachers also reported an increase in their use of assistive technology and laptop computers (see Figure 35).

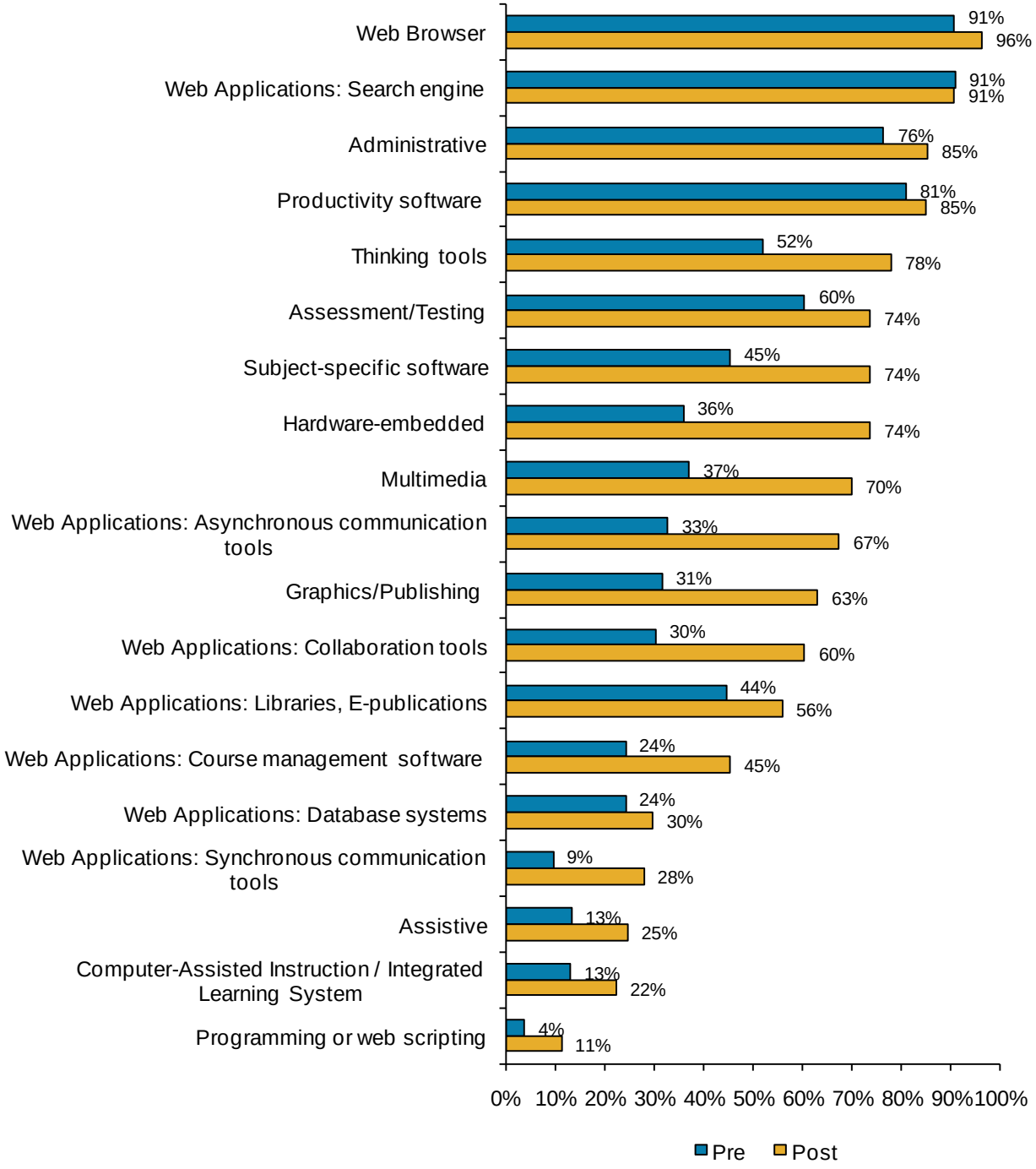
Figure 35. I design instruction that requires the use of these technologies by the teacher*



*The number of responses ranged from 48 to 55 due to missing data.

Mini-Grant teachers also reported increases in their use of various computer applications with students (see Figure 36). Applications that saw the most notable spikes were hardware-embedded technology (e.g., digital whiteboard; 73.6% post, 35.8% pre), asynchronous communication tools (e.g., blogs, wikis; 67.3% post, 32.7% pre), and multimedia (e.g., digital video editing; 69.8% post, 37.0% pre).

Figure 36. What computer applications did/do you use in your instruction with students?*



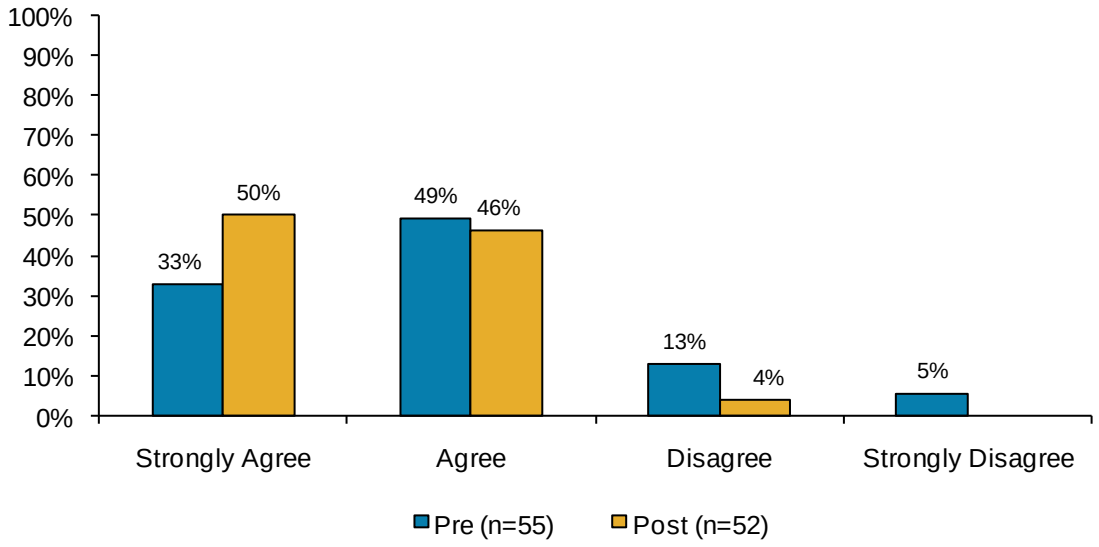
*The number of responses ranged from 52 to 55 due missing data.

Administrators, on average, rated their district as *developing* on the NH STaR Chart in patterns of teachers' technology use (*M*=2.38 out of 4), integration of technology into curriculum areas (*M*=2.44 out of 4), and technology's impact on teacher role (*M*=2.35 out of 4).

More educators agreed they are able to design lessons using digital tools that meet instructional objectives post-implementation (96.2%) than pre (68.6%). Also, a dramatic increase of 39.0 percent of educators reported they purposefully adapt lessons to include digital tools (100.0% post, 61.0% pre). Likewise, more educators felt they were able to use digital tools to personalize learning activities to meet individual student needs post-implementation (88.7%) than pre (56.3%).

Most teachers felt comfortable (96.2%; see Figure 37) and proficient (80.5%) in using technology in their classroom post-implementation (up from 81.8% and 69.1%, respectively). In general, over 90 percent of educators (92.5% post) reported they model safe and ethical use of technology tools.

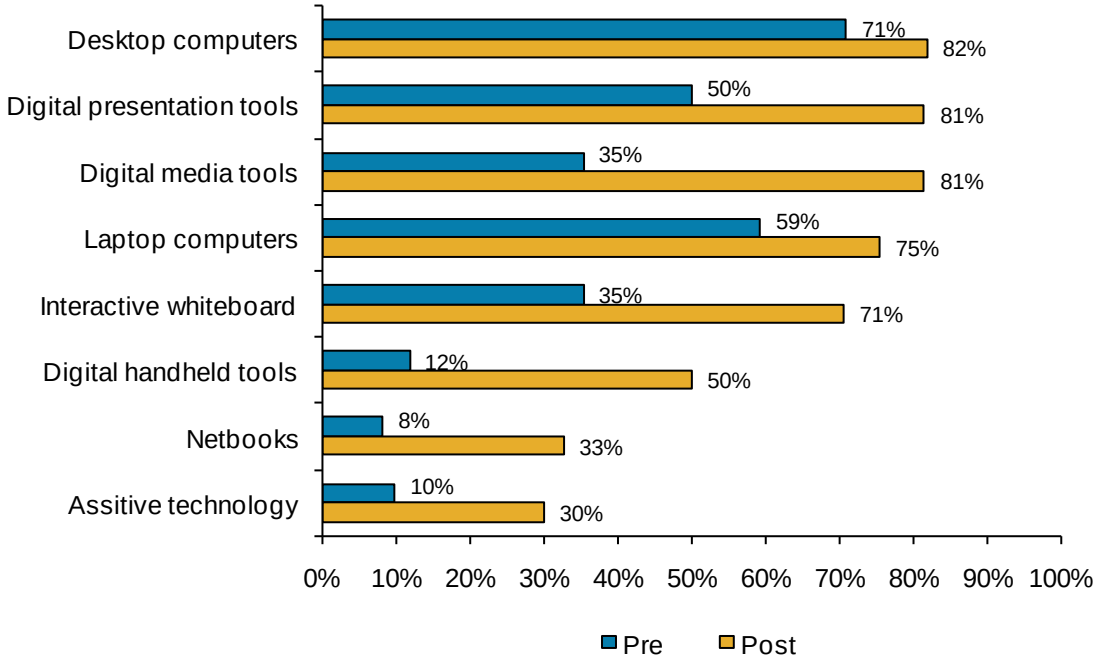
Figure 37. I feel comfortable using technology with my classroom.



Student Practice

Student use of various technologies, as reported by Mini-Grant teachers on the Educator Survey, increased from pre- to post-grant. Specifically, students' use of digital media tools, digital handheld tools, interactive whiteboards, netbooks, and assistive technology increased by over 20 percent (see Figure 38).

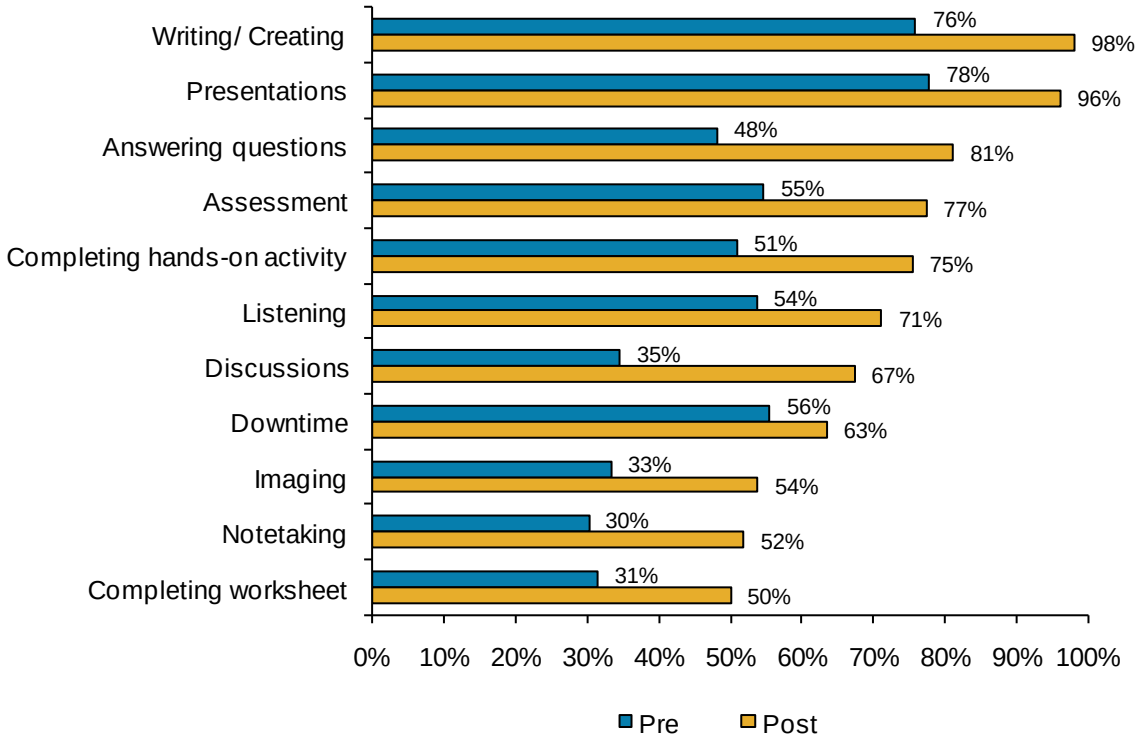
Figure 38. I design learning experience that require the use of these technology by students*



*The number of responses ranged from 49 to 55 due to missing data.

Two-thirds (66.6%) of teachers had their students use the above technologies for learning purposes multiple times per week, as compared to less than one-third (31.5%) pre-grant. Post-grant, teachers also reported higher percentages of students using technology for particular activities; most notably, the percentage of students who used technology for answering questions and discussions increased by over 30 percent (see Figure 39).

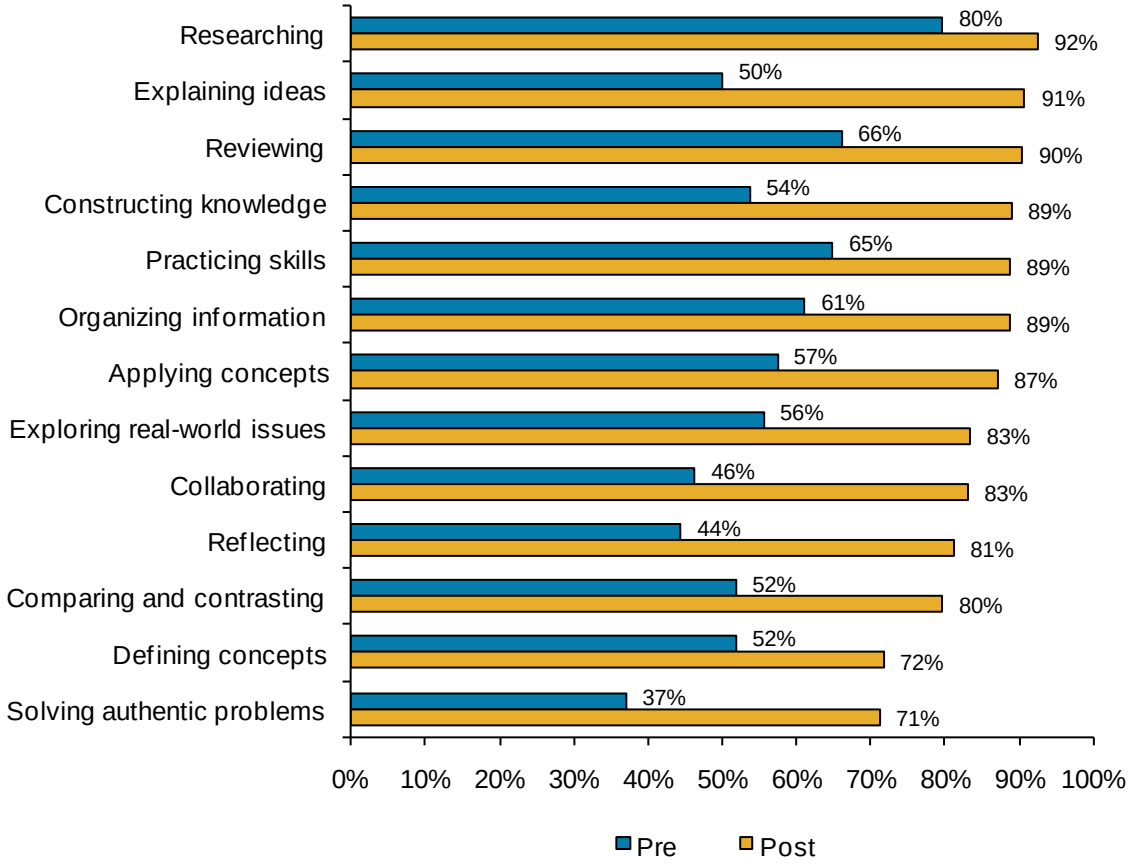
Figure 39. For what activities did/do your students use technology?*



*The number of responses ranged from 51 to 54 due to missing data.

Teachers increasingly reported students using technology for a variety of instructional purposes. In addition to increases in reviewing and practicing skills as basic objectives, teachers frequently reported increases in higher-order thinking skills, like collaborating, solving authentic problems, and reflecting (see Figure 40).

Figure 40. For what purposes did/do your students use technology?*



*The number of responses ranged from 52 to 55 due to missing data.

Mini-Grant project managers addressed several aspects of project implementation on the NH Case Study Report. When describing how the implementation of Mini-Grant funds supported effective teaching practices, project managers most frequently indicated that the funds supported teachers in their implementation of hands-on activities with technology. As one project manager explained, "These students needed opportunities to 'do' science rather than just read or perform simulations."

All but two schools reported that they do set up student accounts, though only 18.9 percent of schools allow students to send and receive email and few schools (8.1%) allow student access outside of school. Just over half of schools, however, reported that their students are allowed unlimited storage space on their servers (51.4%).

While one-third of schools (33.3%) did not purchase Internet based distance-learning content for their students, which serves as supplemental materials to classroom learning, the most common subscriptions of those that did purchase the supplemental materials were *Enchanted Learning* (25.0%), *Grolier Online* (19.4%), or *other* (27.8%). Forty-four percent of schools do not use a digital portfolio solution for creating, viewing and assessing student portfolios, though some schools frequently indicated using *Mahara* (19.4%) or *Adobe Acrobat Pro* (16.7%). While 40.0

percent of schools did not use a course management system to post classroom materials and/or homework assignments, the most common system was *Moodle* (37.1%).

School Culture & Attitudes

Mini-Grant educators increasingly reported positive perceptions of the technology throughout the duration of the grant. Post-grant, teachers were less likely to feel that planning lessons that use technology was more time consuming than planning lessons without technology (39.6% post, 50.9% pre), and the majority of teachers generally felt that classroom management was *not* more difficult when technology was involved (82.4% post, 83.8% pre).

While nearly all educators believed instructional technology improves learning (100.0% post, 98.1% pre), those who *strongly agreed* with this claim increased by 28.3 percent (72.5% post, 44.2% pre). Likewise, participants overwhelmingly found using technology increases their instructional effectiveness (98.0% post, 92.6% pre), with an increase of 23.6 percent of those who *strongly agreed* (58.8% post, 35.2% pre).

The administration's role in the technology rollout was perceived positively by surveyed Mini-Grant educators. Most teachers (92.2%) believed school administrators are interested in the degree to which they use technology effectively with students, though a slightly smaller percent indicated the same of district administrators (78.9%). Also, districts rated the leadership capabilities of principals and district administrators as *developing* on the NH STaR Chart (M=2.68 out of 4).

Post-implementation, 86.5 percent of educators reported they assist one another in developing their technology skills (up from 70.3% pre-implementation), and the frequency of idea sharing for using technology in ways that enhance learning increased by 29 percent for those who purposefully share their ideas once per week or more (68.0% post, 39.0% pre).

Barriers and Facilitators to Project Implementation

When asked to describe their biggest planning challenge, project managers completing the NH Case Study Report reported issues related to the amount of time needed to plan for and coordinate the project (as well as a lack of time to plan). For example, one project manager wrote, "The largest planning challenge was finding time to meet and collaborate with the four Mini-Grant teachers. Teachers and administration enthusiastically supported the idea of the grant, but with one technology integrator for five schools, finding time to meet and plan was a premium." Also, some project managers reported that teachers had difficulty trying to coordinate technology use. For example, one project manager wrote, "The biggest planning challenge was actually timing. Both participating teachers also had to adhere to strict pacing in the rest of their class/curriculum in order to align their final units (timing, etc.)."

Project managers also indicated that difficulty obtaining and implementing the technologies in a short time frame was one of the biggest implementation challenges. Many schools had difficulty getting the technology ordered and into the schools in the time frame provided by the grant. As one administrator wrote, "The biggest implementation challenge was back-ordered equipment. This created a lag in the implementation of our project." After receiving the technology, schools experienced difficulty getting the new technology up and running, and learning how to use the

new technologies in the time allotted. For example, "We also faced some compatibility challenges with our laptops and SMART technology." Another administrator wrote, "Learning the new technology and fully implementing it into lessons [was a challenge]."

When describing the essential conditions necessary for project success, numerous administrators indicated that teacher and administrator support along with teacher collaboration and communication, were among the most important items needed. Throughout the grant, collegial support among teachers became increasingly embedded in schools' technology culture.

Also, project managers provided some recommendations for the replication of the project, such as ensure there are sufficient supports and/or the appropriate staff members to assist with planning and implementation; plan the appropriate professional development; use compatible hardware and software; and plan for a lot of time to be spent on the project.

RQ2: To what degree are these technology-rich settings encouraging mediating outcomes for students, including interactive learning, higher-level thinking skills, and student engagement?

Mini-Grant teachers reported increases in their perception of technology's ability to improve student learning and in students' use of technology for higher-order learning applications. Similarly, teachers and project managers reported increases in students' motivation, concentration, and engagement.

Impact of Technology on Student Engagement

In order to gain a better understanding of the impact the Mini-Grant program has had on student engagement, educators completed a survey which contained items pertaining to technology's impact on student engagement and other mediating outcomes. Through the surveys, educators were asked to reflect on two points in time: before the project began (pre) and after the project ended (post).

Teachers reported increases in students' motivation to complete tasks, the extent to which students are able to stay on-task, and students' overall engagement in technology. Specifically, teachers reported increases of over 20 percent in those who *strongly agree* to each of these statements, indicating that educators have noticed a change in students' motivation, concentration, and engagement when using technology (see Figures 41 through 43).

Figure 41. Students are motivated to complete tasks when using technology

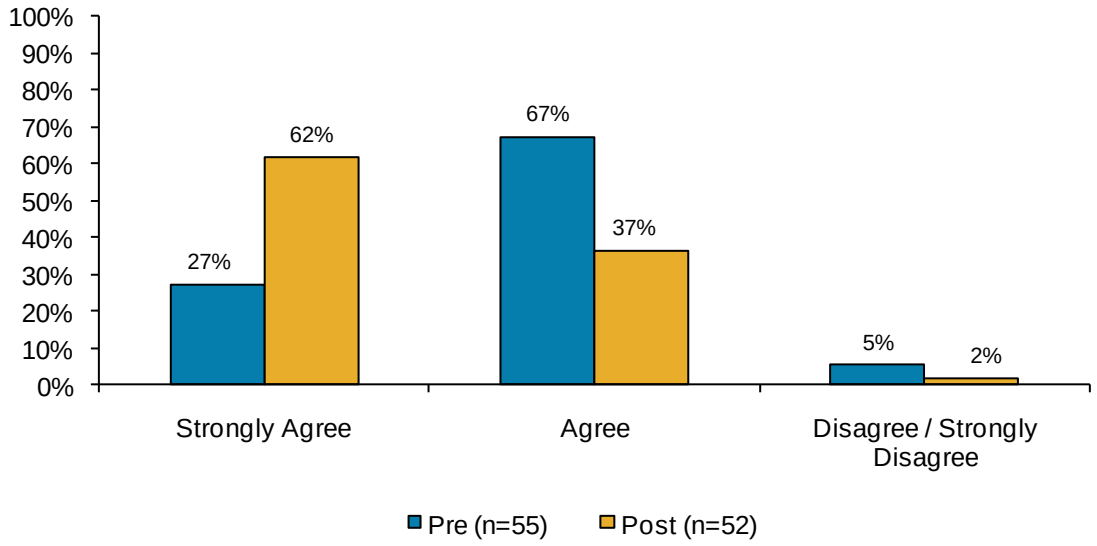


Figure 42. Students are on-task when using technology

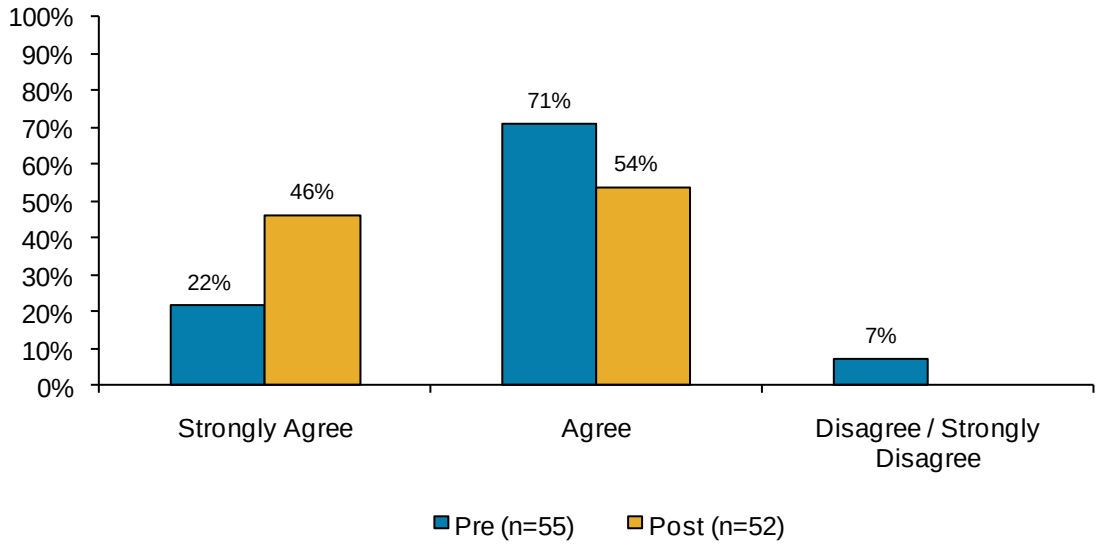
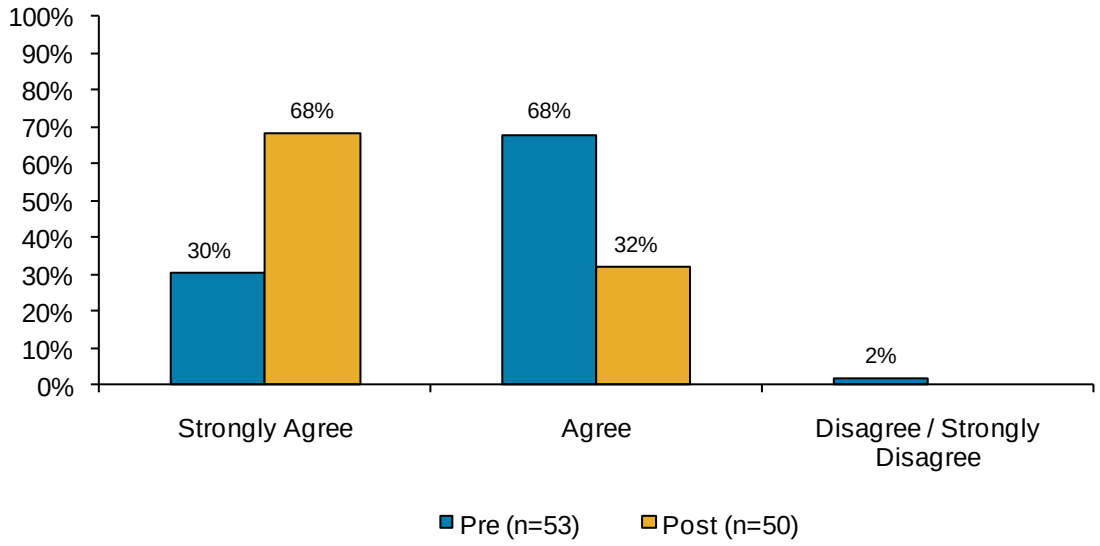


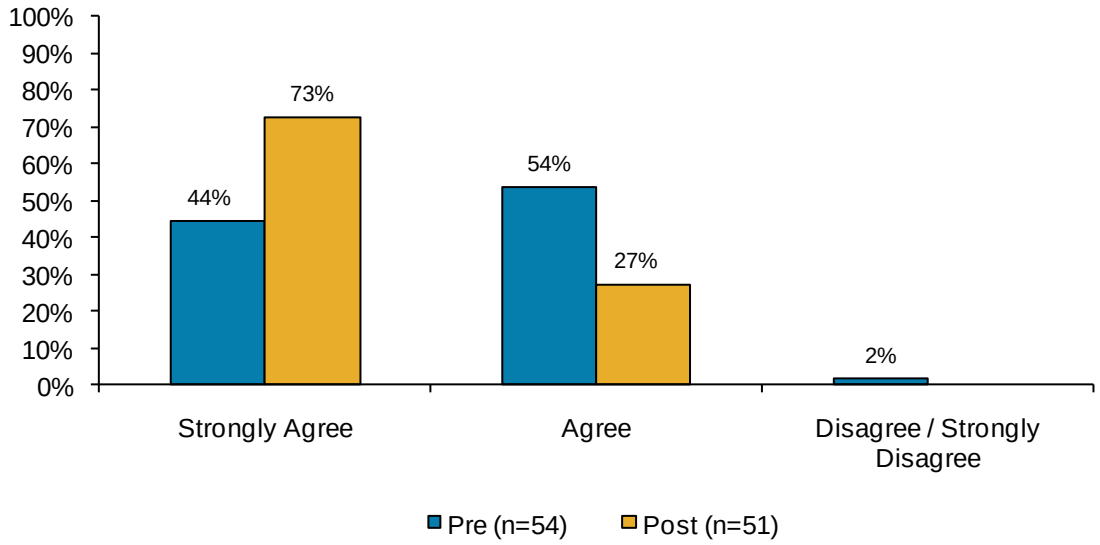
Figure 43. Students are engaged when using technology



Impact of Technology on Interactive Learning and Higher-Level Thinking Skills

Teachers were also asked to evaluate the impact of technology on students' interactive learning and higher-level thinking skills. As with students' engagement, ability to stay on-task, and motivation, following project implementation, more teachers *strongly agreed* that technology improves students' learning at the conclusion of the Mini-Grant project (see Figure 44).

Figure 44. I believe using technology in instruction improves learning



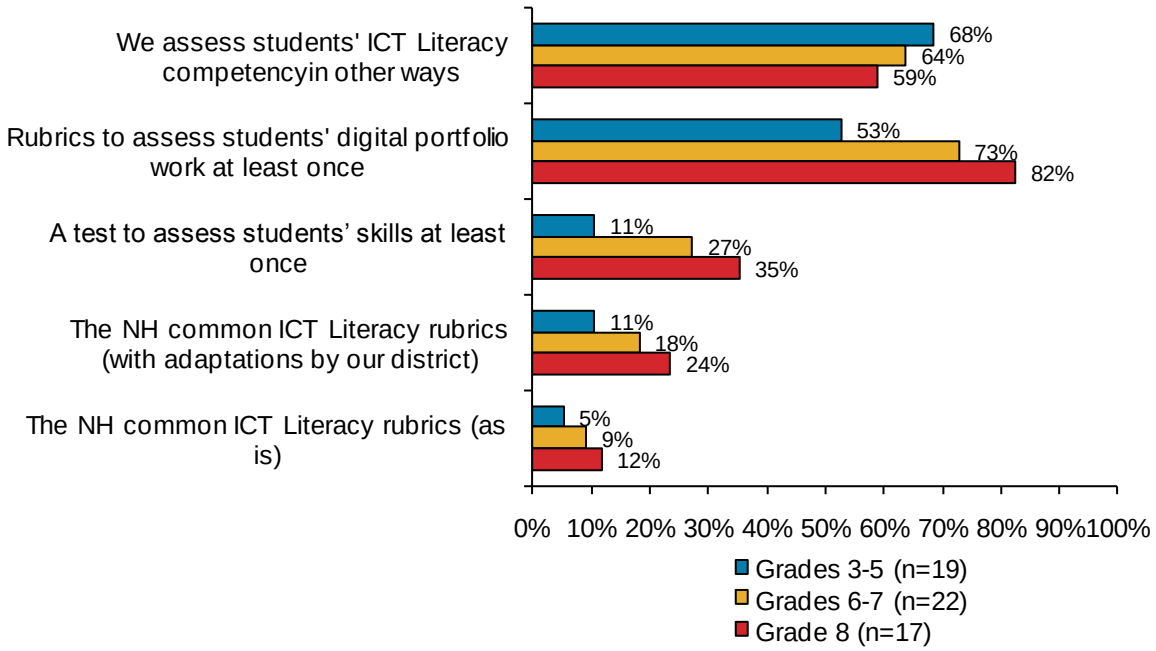
As first reported under RQ 1, teachers indicated that students most frequently used technology to create presentations and answer questions. Post-implementation, the most notable increases in students' use of technology occurred in answering questions (33.0% increase), having

discussions (32.7% increase), completing hands-on activities (24.6% increase), and completing assessments (22.6%).

The use of technology for specific learning purposes also increased substantially following project implementation, most notably for explaining ideas (40.7% increase), collaborating (36.7% increase), reflecting (36.7% increase), and constructing knowledge (35.2% increase). In general, some higher-order learning applications did see notable increases, according to educators, though less complex areas of student learning/thinking also increased.

Administrators from schools that received a Mini-Grant were also asked to identify ways their school assesses ICT literacy skills, which are standards adopted from ISTE NET-S to ensure that students learn 21st century skills. Overall, students are most frequently assessed in grades 3-8 through rubrics to assess students' digital portfolio work or "other" ways (see Figure 45).

Figure 45. Ways Mini-Grant schools are assessing students' ICT literacy skills in Grades 3-8



In the 2010-11 school year, administrators reported that nearly all students met the six ICT competency requirements by the end of eighth grade. The number of students who met each requirement ranged from 89.5 percent (for *communication & collaboration/communication tools*) to 92.0 percent (for *creativity & innovation/productivity tools*; see Table 19). However, as these data refer to all students enrolled in schools that received a Mini-Grant, caution should be taken in associating these results with grant activities.

Table 19. ICT competency attainment of eighth grade students at Mini-Grant schools, 2010-2011[31]

ICT competency requirement	n	8th Grade Enrollments 2010-2011 (Mean)	# of 8th Graders Meeting competency Requirements (Mean)	% of 8th Graders Meeting Competency Requirements (Mean)
Creativity & innovation/productivity tools	18	117.1	110.1	92.0%
Research & information fluency/research tools	18	117.1	110.1	92.0%
Technology operations and concepts	18	117.1	110.5	91.9%
Digital citizenship/social, ethical, human issues	18	117.1	109.8	91.3%
Critical thinking, problem solving, & decision making	18	117.1	109.6	90.8%
Communication & collaboration/communication tools	18	117.1	109.0	89.5%

Note: Percentages represent averages derived from calculations at the individual school level and would not, therefore, align exactly with percentages derived from the mean numbers of 8th graders provided in the table.

While school-level data shows that over 89 percent of eighth grade students met the competency requirements, districts reported slightly lower competencies using the NH STaR Chart. Generally, schools that received a Mini-Grant are hovering between *developing* and *proficient* in patterns of student use (*M*=2.44 out of 4).

In the NH Case Study Report, project managers frequently reported increases in students' classroom achievement levels. As one project manager wrote, "Using the final exams of both the English and U.S. history classes, the teachers were able to see that students gained a deeper, more lasting understanding of the Vietnam War era." Another project manager wrote, "It was easy to see gains made by our students through observations and teacher created rubrics. Students were more confident, independent and were able to better work in cooperative groups. Best of all, they were able to apply what they learned to other content areas and in other classes." A smaller number of project managers indicated they observed increases in the quality of students' work, students' NECAP scores, and that their school reached AYP.

Some project managers also reported increases in students' understanding, comfort with technology, and engagement or enthusiasm on the NH Case Study Report. One project manager wrote:

> Students demonstrated creative thinking, constructed knowledge and developed innovative products and processes using technology. Students used digital media and environments to communicate and work collaboratively. Students used critical thinking skills to plan and conducted research, managed projects, solved problems, and made informed decisions using appropriate digital tools and resources.

[31] An additional two schools provided total eighth grade enrollments but no subsequent ICT data; therefore, they were removed from the analysis.

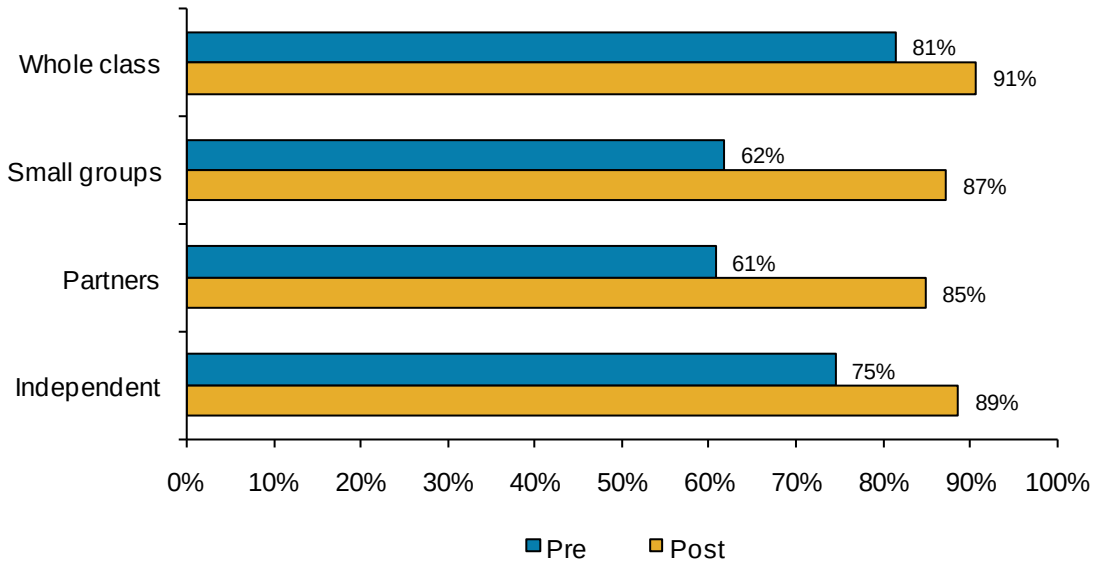
RQ3: To what degree does the provision of technology tools translate into real opportunities for students to collaborate and connect with new content?

Teachers reported more opportunities for students to collaborate through new types of student groups after the grant than had been the case before. In addition, teachers observed an increase in technology being used for student collaboration and an increase in frequency of activities that allow students to connect to new content. Instruction, however, tended to continue to be teacher-directed, despite the introduction of the new technologies.

Technology use among student groupings

Educators were asked to indicate the student groupings present when using technology. Technology was used more frequently post-implementation for all group types, with the percent increases ranging from 9.3 percent (for whole class) to 25.5 percent (for small groups; Figure 46). In addition, the most substantial increases were in technology being used for small groups and partner work, which allows for the greatest opportunities for students to collaborate (as compared to whole class and individual activities).

Figure 46. Student groupings present when using technology*



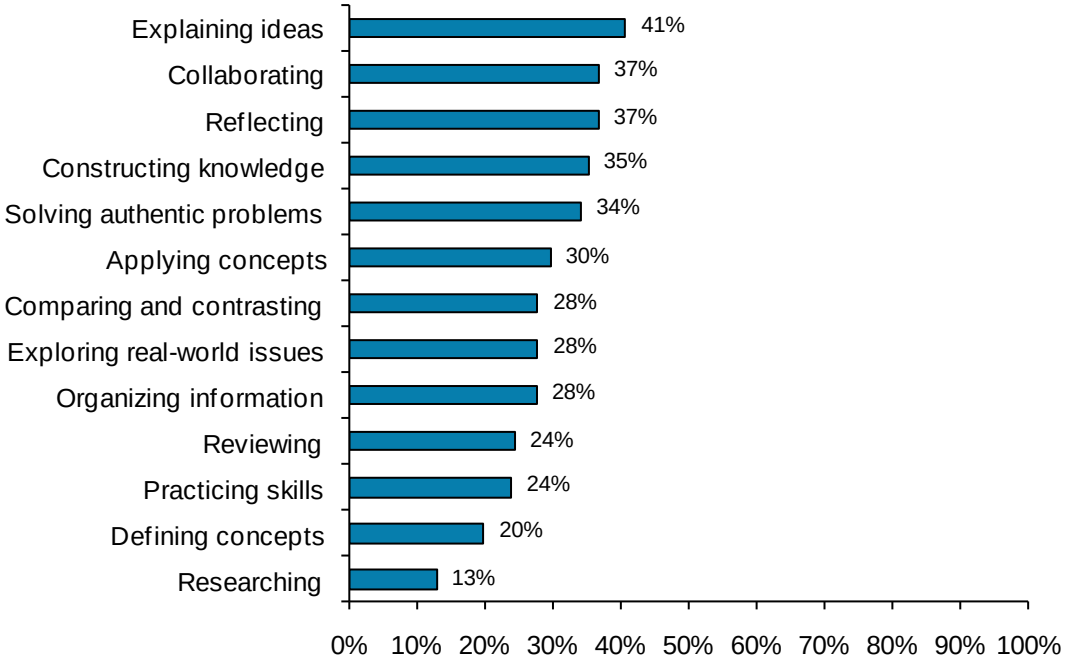
*The number of responses ranged from 51 to 55 due to missing data.

Tech applications promoting collaboration and connections to new content

Using the NH Case Study Report, project managers reported student achievement gains that resulted from project implementation, and several described opportunities for students to collaborate. As one project manager described, "Students were more confident, independent and were able to better work in cooperative groups," A second project manager wrote, "Students used digital media and environments to communicate and work collaboratively. Students used critical thinking skills to plan and conducted research, managed projects, solved problems, and made informed decisions using appropriate digital tools and resources."

Likewise, teachers reported increases in student use of technology for multiple purposes, and collaboration increased by 36.7 percent (see Figure 47). Many other purposes that also increased might provide students with ways to connect to new content (e.g., constructing knowledge, solving authentic problems). Also, teachers often reported increases in opportunities for hands-on activities, writing/creating, and presentations.

Figure 47. Change in teachers' reported use of technology purposes by students (from pre to post)*



*The number of responses ranged from 52 to 54 due to missing data.

As reported in RQ2, nearly ninety percent (89.5%) of eighth grade students met the ICT competency requirement for the *communication and collaboration* criterion. Finally, data provided in the NH STaR Chart indicates that districts are *developing* their concept of the teacher role (*M*=2.35 out of 4). This indicates that learning is mostly teacher-directed and not entirely student-centered.

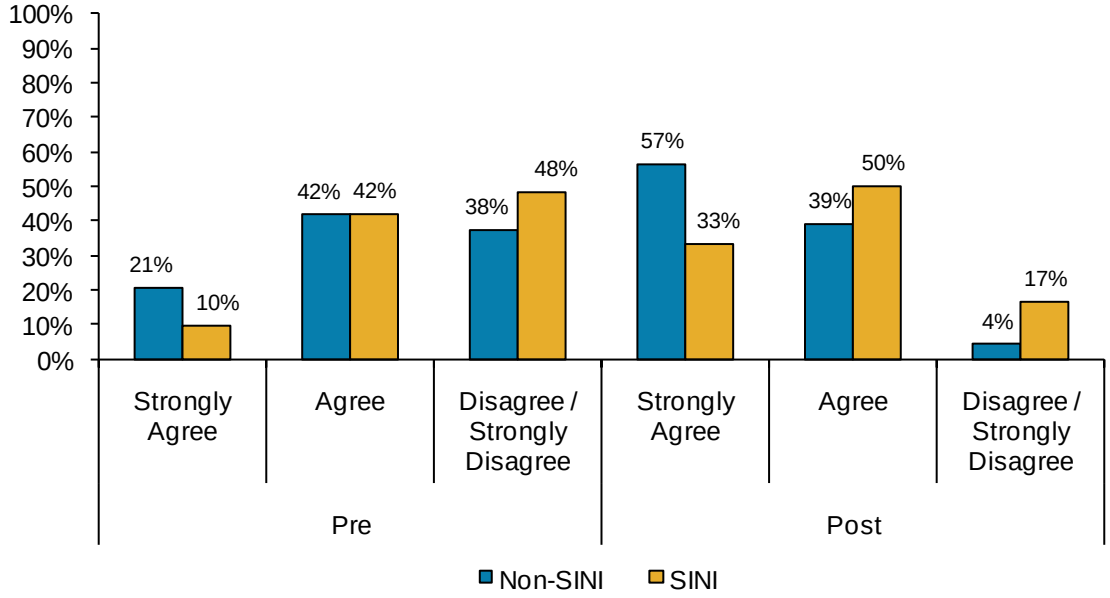
RQ4: How are new technologies and resources serving students of various groups, including those with the highest need?

In order to examine differences in project impact on student of various groups, schools participating in the grant were separated into two categories: schools in need of improvement (SINI) and schools not in need of improvement (non-SINI). Of the 40 schools that received a Mini-Grant, 23 are SINIs. The Educator Survey was completed by 31 teachers from SINIs and 24 teachers from non-SINIs (see Table 29 in Appendix 6). In general, SINI and non-SINI educators reported similar increases in their abilities to personalize learning activities, though SINI teachers reported less confidence at both points in time.

Utilizing digital tools to meet individual student needs

Over 60 percent of non-SINI educators reported that they were able to use digital tools to personalize learning activities and meet individual student needs before the project began, while 51.6 percent of SINI educators were able to use digital tools to that effect. This gap remained consistent after the project ended as both non-SINI and SINI educators' agreement levels increased (95.6% and 83.3%, respectively; see Figure 48).

Figure 48. I am able to use digital tools to personalize learning activities to meet individual student needs*



*The number of responses for non-SINIs ranged from 23 to 24, and 30 to 31 for the SINIs.

Using the NH Case Study Report, project managers described classroom-level characteristics important to the project. Project managers from both SINIs and non-SINIs indicated that integration of technology into instruction is important to the project. However, slightly more project managers from SINIs highlighted just how important technology integration is to project success. As one SINI project manager described, "As a result, students retained more information, learned to work with small groups utilizing their individual talents as part of a team!" Another SINI project manager indicated that technology integration helped serve

differentiation of instruction stating, "With the variety of devices, teachers were able to use technology to engage every child, even those that struggled with language and or literacy." An additional SINI project manager indicated, "Teachers utilized best practices by incorporating opportunities for students to use a variety of learning styles and strengths throughout the project."

RQ5: How are grantees doing in terms of training teachers not only how to use technology but also how to translate their new skills into practice in their teaching?

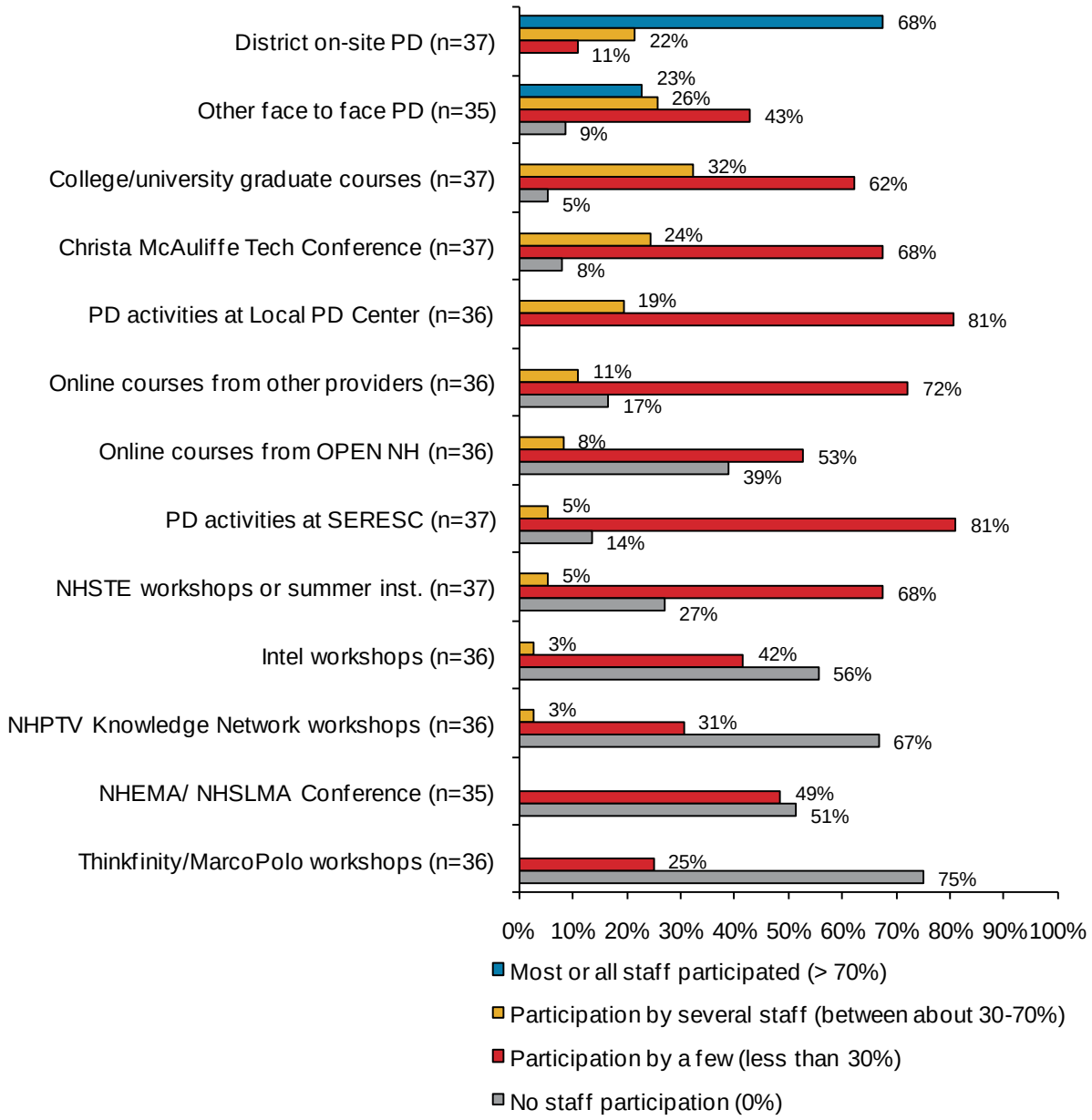
While administrators reported that staff members frequently participated in on-site professional development and teachers reported an increase in their participation in OLCs, several district administrators still reported a need for content-based training.

Participation in Training Activities

Educators and administrators provided feedback on the training they have participated in, as well as additional professional development needs.

Just over two-thirds of administrators (67.6%) from schools that received a Mini-Grant reported that most or all staff in their school participated in district on-site professional development. Many administrators also reported that a small portion of their staff (<30%) in their school participated in activities at the Southeast Regional Education Service Center (81.1%), activities at a local PD center (80.6%), or online courses from other providers (72.2%; see Figure 49).

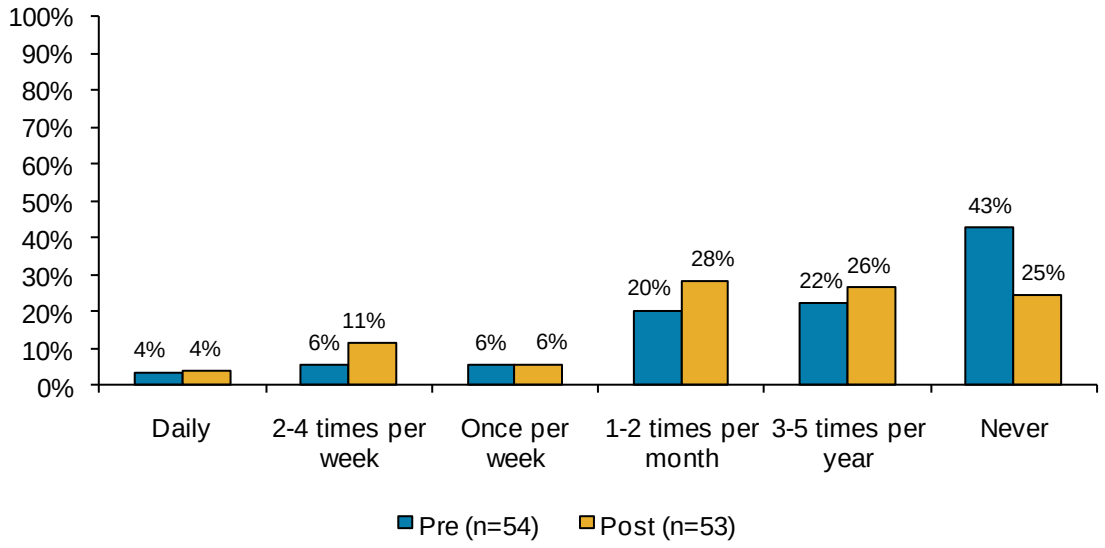
Figure 49. Staff participation in professional development or training[32]



[32] This figure represents school-wide participation in professional development.

Teachers retrospectively reflected on their participation in OLCs for professional development. Following project implementation, frequency of OLC participation increased, and the percentage of teachers who reported never engaging in online learning communities decreased from 42.6 to 24.5 percent (see Figure 50).

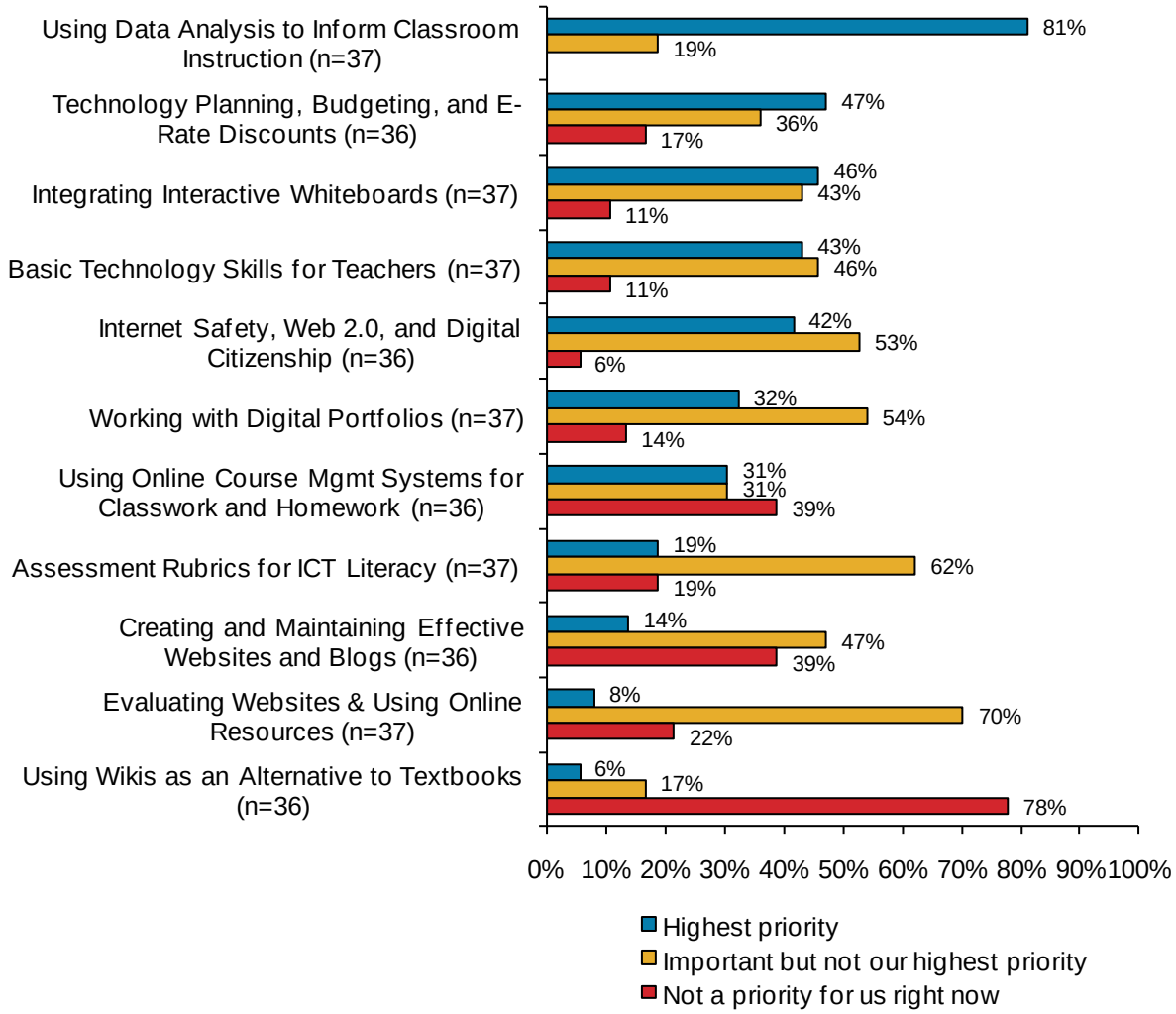
Figure 50. Frequency of teacher participation in online learning communities for professional development



Professional Development Content and Teachers' Training Needs

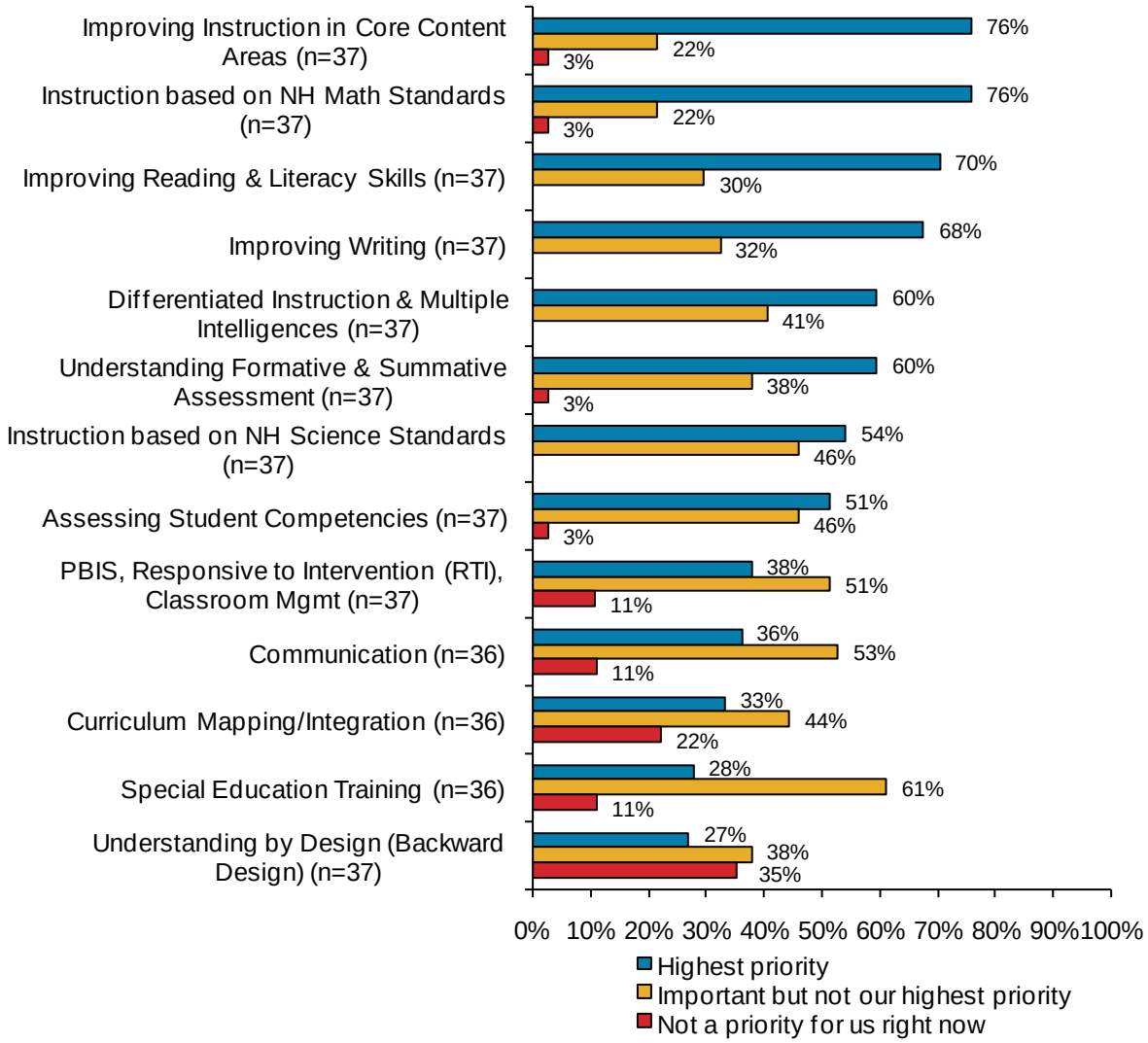
When rating the importance of various technology professional development topics for their school, 81.1 percent of administrators indicated "using data analysis to inform classroom instruction" as the *highest priority*. All other professional development topics were also rated highly, with half of the districts indicating *highest priority* and the other half indicating *important but not highest priority*. The only item that received a majority rating of *not a priority* was using wikis as an alternative to textbooks (77.8%; see Figure 51).

Figure 51. Teachers' need for professional development of technology topics



In considering professional development topics outside of technology, 75.7 percent of administrators rated *improving instruction in core content areas* and *instruction based on NH Math standards* as the highest priorities. Several other topics were also identified as high priority and few topics were rated as *not a priority*. *Understanding by Design* was the lowest-ranked professional development topic, with 35.1 percent of respondents regarding it as *not a priority* (see Figure 52).

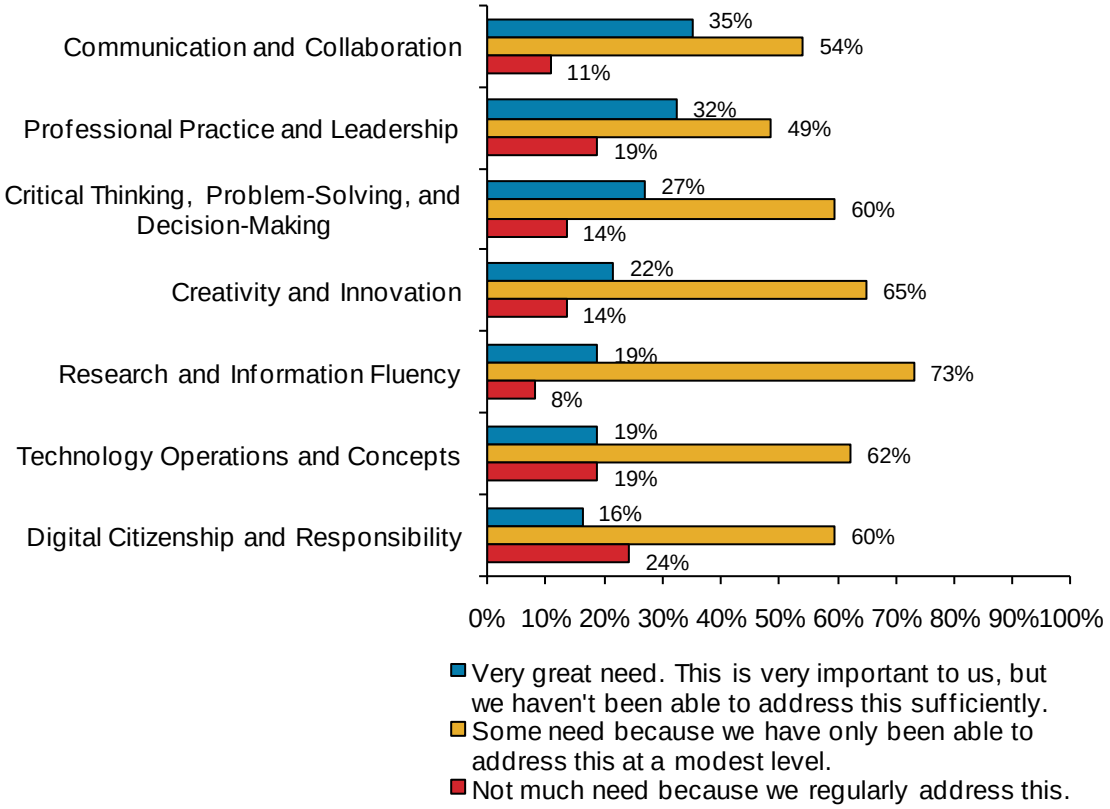
Figure 52. Teachers' need for professional development of non-technology topics



In general, most of the topics that administrators rated as *highest* priority include content-based trainings (e.g., improving instruction in core content areas, instruction based on NH math standards, improving reading and literacy, improving writing). While other trainings are also highly rated as *highest priority* or *important*, administrators are primarily focused on the direct need to improve students' skills (e.g., reading, writing, math).

Administrators were also asked to indicate levels of training needs within each ISTE NETS-T content area. The majority of respondents indicated that their schools have been able to address most content areas, but have *some need* for additional training. Of those who did not indicate *some need*, between 16.2 and 35.1 percent of respondents reported a *very great need* for each category and 8.1 to 24.3 percent indicated *no need* for each category (see Figure 53). Similarly, administrators' reported educators' technology competencies (or capabilities) are *developing* (*M*=2.47 out of 4).

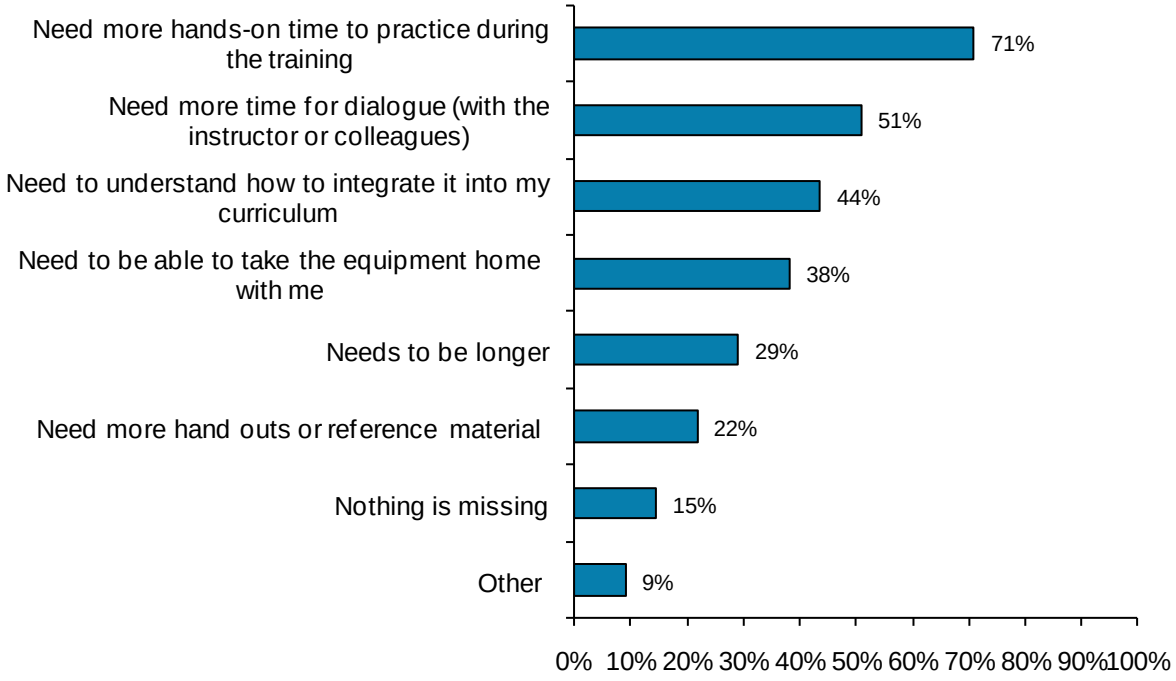
Figure 53. Teachers' need for professional development in NETS-T content areas (n=37)



Administrators completing the NH STaR chart rated their districts, on average, as *developing* in their content of training (M=2.68 out of 4). On average, administrators indicate their districts are *developing* in their models of professional development (*M*=2.47 out of 4).

When asked what aspects of training are missing from current professional development opportunities, the most common response was the need for more hands-on time to practice during training (70.9%). Approximately half of the respondents also identified more time for dialogue with the instructor or colleagues (50.9%), and understanding how to integrate the training into curriculum (43.6%) as shortcomings (see Figure 54). Also noteworthy, 81.1 percent of administrator respondents to the School ICT Literacy/Professional Development survey reported that their school provides teachers with time during regular school hours for learning and professional development growth opportunities.

Figure 54. What aspects of training do you feel are missing from current trainings? (post; n=55)



Sustainability for Continued Technology Integration

Mini-Grant participants were asked specific questions regarding program sustainability. Districts reported they were nearing *proficient* (*M*=2.85 out of 4) levels in establishing a long-term vision for technology integration on the NH STaR Chart.

When discussing sustainability, most project managers indicated that the technology will continue to be implemented and used in the coming years. Several project managers cited staff meetings as ways in which teachers will continue learning from one another, though some indicated there will be opportunities for additional professional development. A smaller number of project managers indicated that more hardware/software has been or will be purchased.

Nearly all NH Case Study Report respondents indicated they have or plan to share outcomes of their projects with various stakeholders, including staff members, parents, school board members, community members, and other Mini-Grant participants. Commonly cited strategies for sharing project impact included general sharing at meetings or workshops, attending or presenting at conferences, newspaper or local television coverage, newsletters, and school/district websites.

2. Conclusions

The section that follows presents conclusions based upon the interpretation of findings across the five research questions.

RQ1: How well are school staff members turning classrooms into technology-rich learning environments, fully equipped with hardware, software, and rich digital resources for learning?

At the school- and district-level, Mini-Grant participants have a variety of technology tools and supports in place that allowed for increased technology use by teachers and students. In particular, teachers were much more frequently using digital presentation, media, and handheld tools, as well as netbooks, interactive whiteboards, and assistive technology. With the increased availability of technologies, increased teacher use, and increased teacher comfort and proficiency with technology, it is not surprising that teachers reported they are able to design lessons using digital tools that meet instructional objectives more frequently after the grant than they did before.

As might be expected with the increase in teachers' comfort and use of technology, substantial increases in student technology use were also reported. Student use increased for many types of activities, such as presenting and writing/creating.

Mini-Grant educators also generally reported the presence of a culture of support in their districts and schools regarding the integration of technology into instruction, and all educators believed instructional technology improves learning.

RQ2: To what degree are these technology-rich settings encouraging mediating outcomes for students, including interactive learning, higher-level thinking skills, and student engagement?

Following project implementation, over 25 percent more teachers *strongly agreed* that students are engaged, motivated, and able to stay on task when they use technology. Teachers also noted changes in students' technology use for specific learning purposes (e.g., explaining ideas, collaborating, reflecting, constructing knowledge), some of which target interactive learning and higher-level thinking skills.

Additional professional development to target technology use for interactive learning or higher-level thinking skills may be beneficial for teachers. With additional time, students will also continue to familiarize themselves with the technologies and opportunities for interactive learning, and more advanced cognitive levels of student learning may continue to arise.

RQ3: To what degree does the provision of technology tools translate into real opportunities for students to collaborate and connect with new content?

Mini-Grant teachers reported increases in the use of technology in many student activities, including a 36.7 percent increase in student use of technology for collaboration. In addition, students working in small groups and doing partner work substantially increased, allowing students more opportunities to collaborate with and learn from their peers. However, the percentage of eighth graders who met the ICT standard of *communication and collaboration* was the lowest percentage, indicating there is room to improve students' collaboration skills.

RQ4: How are new technologies and resources serving students of various groups, including those with the highest need?

Both SINI and non-SINI educators reported increases in their abilities to use digital tools to personalize learning activities; however, these SINI educators reported lower abilities than non-SINI educators at both pre- and post-project. Project managers completing the NH Case Study Report, however, reported increases in teachers' abilities to utilize technologies for various student learning styles and groups. As teachers continue to become more comfortable using technology, more opportunities to individualize and differentiate instruction to students in need may arise.

RQ5: How are grantees doing in terms of training teachers not only how to use technology but also how to translate their new skills into practice in their teaching?

In general, administrators reported that most teachers participated in on-site professional development during the 2010-11 school year. Teachers also reported an increase in their participation in OLCs after the grant. While some educators provided no recommendations for changes in training, many felt the need for more hands-on practice during professional development.

Most administrators reported that *using data analysis to inform classroom instruction* was the *highest* priority for teacher training topics. Administrators also felt that content-based (e.g., improving writing) training for their teachers is one of the *highest* priorities. Ultimately, these content-based training topics are essential ingredients for improving students' skills. Administrators reported being able to address ISTE NETS-T areas in trainings with teachers to some degree, though most administrators indicated *some need* for additional training in all areas.

C. Tech Leader Cohort (TLC) Program

1. Findings By Research Question

RQ1: How well are school staff members turning classrooms into technology-rich learning environments, fully equipped with hardware, software, and rich digital resources for learning?

TLC recipients have capitalized on the suite of hardware, software and support systems put in place by the end of the grant cycle. Not only did schools house a variety of computer and mobile/digital devices, but nearly all schools had adequate connection speeds, storage space, safety provisions, and management/support solutions. These resources laid the foundation for more varied pedagogical approaches and the TLC initiative contributed to increased confidence among teachers for tech-enabled learning, administration's role in capacity-building, and educators' own abilities to optimize their use of the resources. Educators were cultivating a community of practice around technology use and applying it in effective and meaningful ways with students. Teachers seemed primed to continue orienting their efforts toward a shared vision for technology-enhanced teaching and learning.

District-Level Technology Support and Infrastructure

The District Technology Survey distributed to TLC grant recipients was completed by 30 districts in Spring 2011. Their feedback detailed a range of provisions and capabilities that contributed to key outcomes throughout the 2010-11 school year.

Regarding general Internet provisions, districts that received a TLC grant reported a range of service vendors, including *Comcast* (26.7%), *Time Warner* (23.3%), *Destek* (20.0%), and *Metrocast* (20.0%). The majority of TLC districts (66.7%) had a full T1/ATM bandwidth or better while another 30.0 percent had an ISDN, DSL, broadband/cable, or fractional T1; just one district reported having no connection. Progress in Internet access and provisions was evident in the NH STaR Chart data, as reported by 32 TLC representatives at the district level. On the whole, districts reported high levels of LAN/WAN connectivity (*M*=3.06 out of a possible 4), and overall access (*M*=3.22 out of 4) .

Districts that received a TLC grant relied on a variety of Internet filtering systems, with *iPrism* and *Sonic Wall* most often cited. More than half of the respondents (60.0%) kept their filtering log files for up to 30 days, while just 10.0 percent of districts typically held onto them for more than a calendar year. Just over half of districts (56.7%) spent fewer than five hours each month maintaining these filters and fulfilling block/unblock requests, and no district spent more than 16 hours a month on these activities. According to NH STaR Chart responses, districts were *proficient* (*M*=3.28 out of 4) in their security provisions.

All but three district respondents reported a library automation system. *Follett* is used by 55.6 percent of the districts, while *Sagebrush Spectrum* (14.8%), *LibraryWorld* (7.4%) and *ResourceMate* (7.4%) are used less widely.[33] Sixty percent of respondents, however, reported no district-wide curriculum software, though 23.3 percent did cite *TechPaths*. Three districts also cited locally developed systems using *MS Access, FileMaker* or other software.

Most districts that received a TLC grant had either an expectation (53.3%) or a policy (43.3%) for teachers to use their school-/district-assigned email address as a primary school communication tool. Districts used a variety of email solutions, including *MS Outlook* and *Ipswitch IMail*. Greater than half of respondents (63.3%) reported more than five hours are spent monthly on email maintenance, with 30.0 percent of districts spending up to 16 hours a month.

Thirty percent of responding districts reported just one full-time (16.7%) or part-time (13.3%) IT staff member for the whole district; 23.3 percent had two full-time IT personnel, while 46.6 percent had three or more. Among districts with just one IT staff member who also serves the district in other capacities, those other roles commonly included library media specialist, computer/technology teacher, or other technology specialist/director. The majority of districts relied on their district technology directors/coordinators for both their hardware (66.7%) and software (63.3%) support (compared to 17-23% of districts that call on an external IT company or individual for tech/applications support), though several tech coordinators and staff provide

[33] LibraryWorld and ResourceMate were not listed on the NH District Technology Survey and were written in by more than one district.

hardware (57.0%) and software (63.0%) support to *multiple* school buildings. Regarding support for integrating technology into 21st century learning, districts predominantly relied on full-time district-level technology staff (46.7%), and 56.7 percent of districts had staff that provided these services to multiple schools.[34] On average, districts indicated their technical support (*M*=2.59 out of 4) and the role of a technology integration specialist (M=2.19 out of 4) were *developing*.

The table below presents the dollar amounts budgeted for hardware, software, connectivity, and tech support staff among the TLC districts for the 2009-10, 2010-11, and 2011-12 school years. While some districts increased their technology budgets over the three years, the average among all TLC recipients remained fairly stable (see Table 20). Also, using the NH STaR Chart, districts indicated an average of *developing* in their budget levels (*M*=2.59 out of 4) and allocation of funds per student (*M*=2.03 out of 4).

Table 20. Locally budgeted amounts for district technology (District Tech Survey)

School year	N (districts)	Min	Max	Mean
2009-2010	28	$8,000	$920,000	$280,314
2010-2011	28	$8,000	$980,000	$285,012
2011-2012	26	$10,000	$1,200,000	$276,423

School-Level Support and Infrastructure

The NH School Technology Access Survey was completed for 42 school buildings that received a TLC grant.[35]

The majority of schools (86.5%) reported instructional access to PC equipment, while half (50.0%) reported having Mac computers. Of the schools with Mac equipment, only four schools reported having more than 100 Macs, while half (50.0%) of schools with PCs reported having more than 100. Just over half of schools (52.4%) reported having thin client or netbooks, and half (50.0%) of the schools with this equipment had 40 or more. On average, districts that received a TLC grant were nearing *proficient* levels of student-to-computer ratios (*M*=2.69 out of 4).

Among buildings with access to mobile computer labs (76.2%), nearly all schools share access to the labs among several classrooms. However, four schools had just one or two mobile labs for 25 or more rooms (one of which shared two carts among 66 rooms). Conversely, in 13 schools, the mobile labs were only shared amongst fewer than ten classrooms per building (despite nine of these schools having 20 or more instructional rooms). Districts, on average, reported their designs of instructional settings were *developing* (*M*=2.69 out of 4) on the NH STaR Chart. Also, 78.5 percent of TLC educators completing the Educator Survey reported that computer labs were available when they needed them.

Most schools that received a TLC grant reported that they provide at least some of their teachers with computers. More than half of schools (69.3%) provided some of their teachers with desktop

[34] Districts could select more than one response for all items discussed in this paragraph.
[35] Because the survey asked respondents to report on building-level conditions, only one survey was completed for three pairs of schools (the buildings were combined junior/senior high schools).

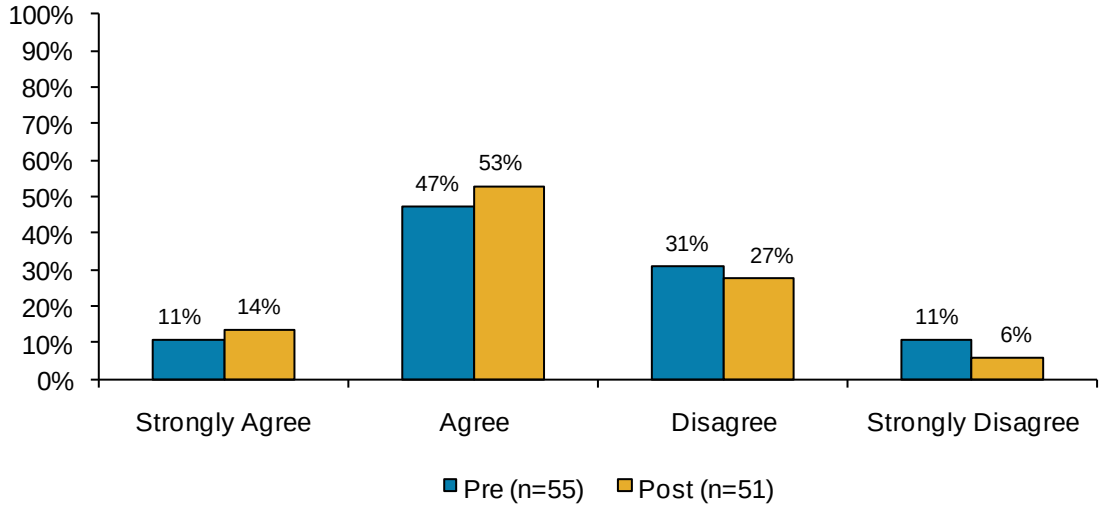
computers, while nearly all schools (97.6%) provided some of their teachers with laptops. Of those schools that provide desktops or laptops, 59.3 percent provide 15 or more teachers with desktops, and 57.5 percent provide 15 or more teachers with laptops.

TLC recipients had a variety of presentation tools at hand, as reported in the Technology Access Survey. All but one building had access to a digital/LCD projector, while the majority (76.2%) also had cable TV in the classrooms. All but four schools that received a TLC grant had interactive whiteboards; most prevalent were Smart Boards (found within 71.8% of schools with whiteboards). One-third of schools also had large (32"+) monitors, but there were only two screens per building on average among schools with this technology. Among digital handheld devices available, at least 80 percent of schools had digital cameras, digital video cameras, and image scanners, while more than three-quarters had classroom sets of student response systems/clickers. Nearly a quarter of schools (23.8%) had classroom sets of iPod Touch devices, 42.9 percent had portable keyboards, and 38.1 percent had MP3 players or similar devices. Reports on the NH STaR Chart confirmed that districts, on average, were near-*proficient* (*M*=2.94 out of 4) in the availability of technologies (e.g., TVs, DVDs, digital cameras, calculators).

All but one TLC school had accounts set up for *all* teachers on their networks, though personnel at only 19.0 percent of schools could access their files off-site. However, all schools that received a TLC grant provided email accounts to teachers that could be accessed elsewhere. In fact, most schools (81.0%) mandated that their teachers use their school email accounts as a primary school communication tool, though just eight buildings required teachers to maintain a class webpage.

Teachers were more likely to report that their schools' technology functioned properly after the grant than before the grant (78.4% vs. 67.3%). Also, educators increasingly reported that they received sufficient support for successfully using technology with their students (66.6% post, 58.2% pre; see Figure 55). Also, teachers' perception of curriculum support for integrating technology with their students notably increased by 25.1 percent (76.0% post, 50.9% pre).

Figure 55. I receive enough technical support to be successful in using technology with students



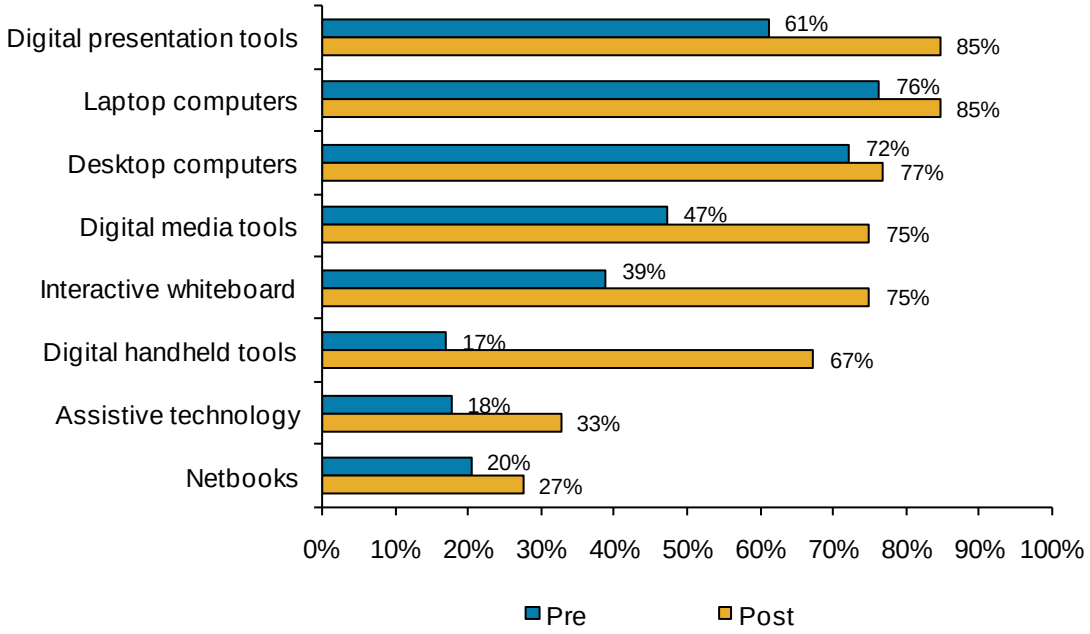
School building administrators indicated that hardware maintenance was provided primarily by paid full time (47.2%) and part time (38.9%) staff members; similarly, curriculum integration was provided by paid full time (48.7%) and part time (38.5%) staff members. Support for curriculum integration was provided by a lower percentage of full time staff (33.3%) than hardware maintenance or software support, and is primarily provided by paid part time (39.4%). None of the TLC recipients reported having a formal student tech support program (e.g., GenYes).

Teacher Practice

By the end of the TLC grant, nearly half of educators (47.3%) were using technology in their instruction with students every day, compared to 21.8 percent before the grant began. Another 30.9 percent were using technology in their instruction 2-4 times each week post-implementation.

TLC educators ultimately tapped a variety of technology resources in their instruction and planning, and seemed to do so in greater numbers by the end of the grant. Most notably, while computer use remained prevalent, teachers' use of interactive whiteboards and digital technologies increased after having participated in the grant. Teachers also reported an increase in their use of laptops and alternative technologies (see Figure 56).

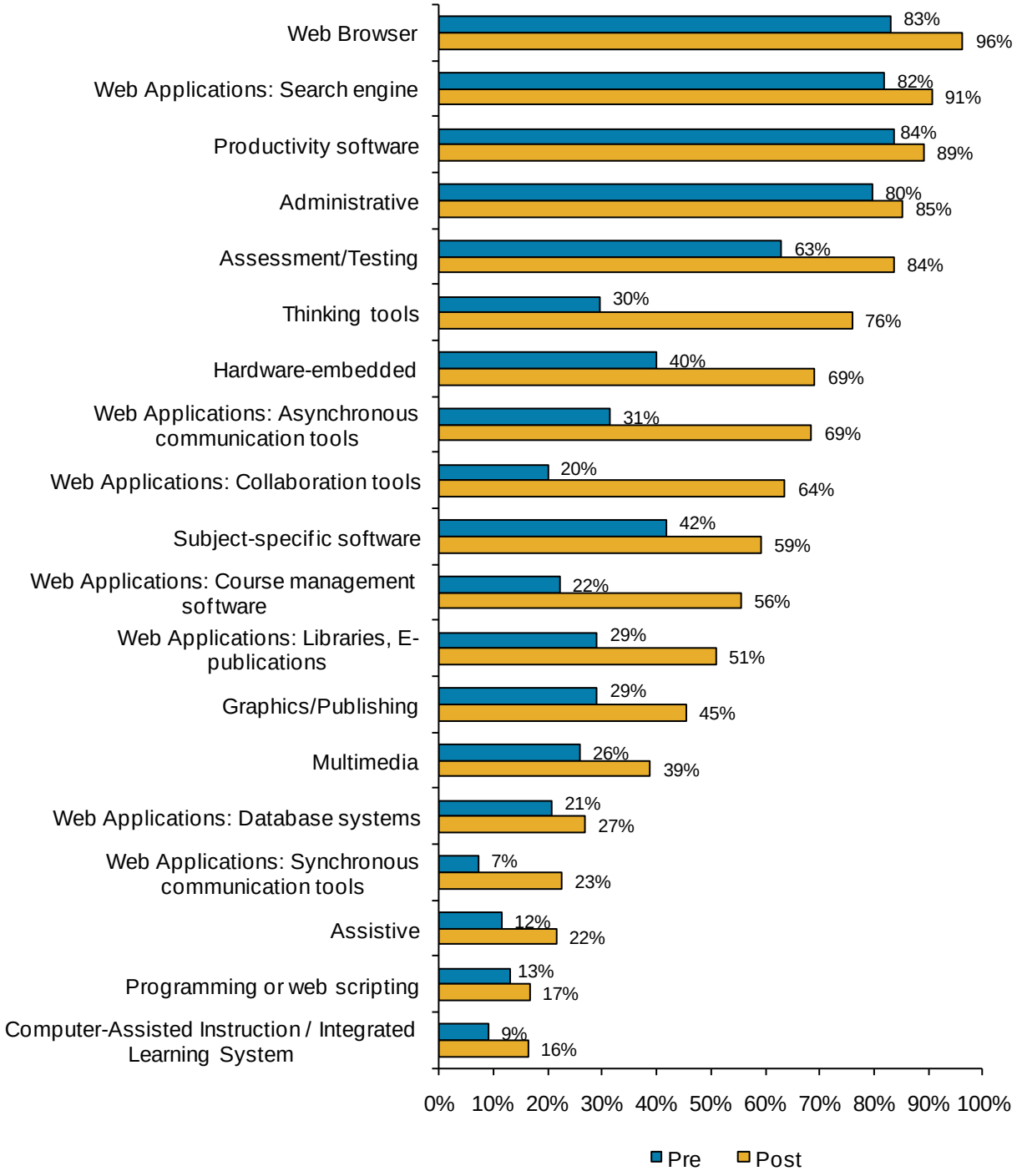
Figure 56. I design instruction that requires the use of these technologies by the teacher*



*The number of responses ranged from 49 to 55 due to missing data.

Teachers also reported increases in their use of numerous computer applications in their instruction with students as they progressed through the grant period (see Figure 57). Applications that saw the most notable spikes in usage included thinking tools (which increased from 30.0% to 76.0%) and collaboration tools (which increased from 20.0% to 64.0%).

Figure 57. What computer applications did/do you use in your instruction with students?*



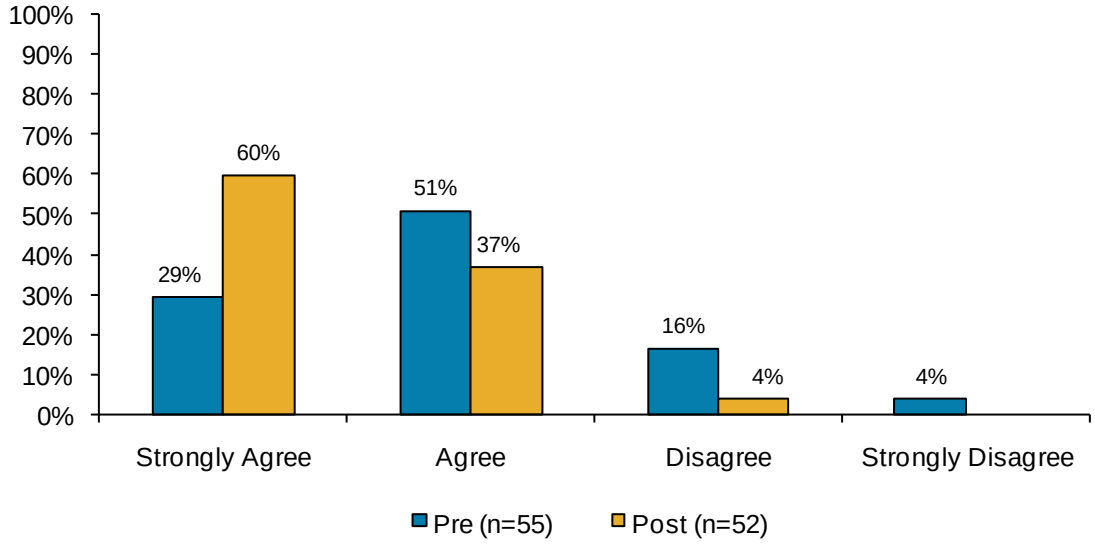
*The number of responses ranged from 51 to 55 due to missing data.

On average, districts indicated on the NH STaR Chart that they are *developing* in their patterns of teacher use of technology (*M*=2.44 of 4), integration of technology into curricular areas (*M*=2.56 out of 4), and technology's impact on teacher role (*M*=2.59 out of 4).

More educators agreed they are able to design lessons using digital tools that meet instructional objectives post-implementation (90.2%) than pre (64.1%). Also, a dramatic increase of 35.6 percent of educators reported they purposefully adapt lessons to include digital tools (92.2% post, 56.6% pre). Likewise, more educators felt they were able to use digital tools to personalize learning activities to meet individual student needs post-implementation (78.4%) than pre (43.7%).

Almost all teachers felt comfortable (96.2%; see Figure 58) and proficient (92.2%) with technology post-implementation (up from 80.0% and 64.2%, respectively). Furthermore, all TLC educators at the end of the grant reported that they were certain to model safe and ethical technology use for their students, an increase from 89.0 percent pre-grant.

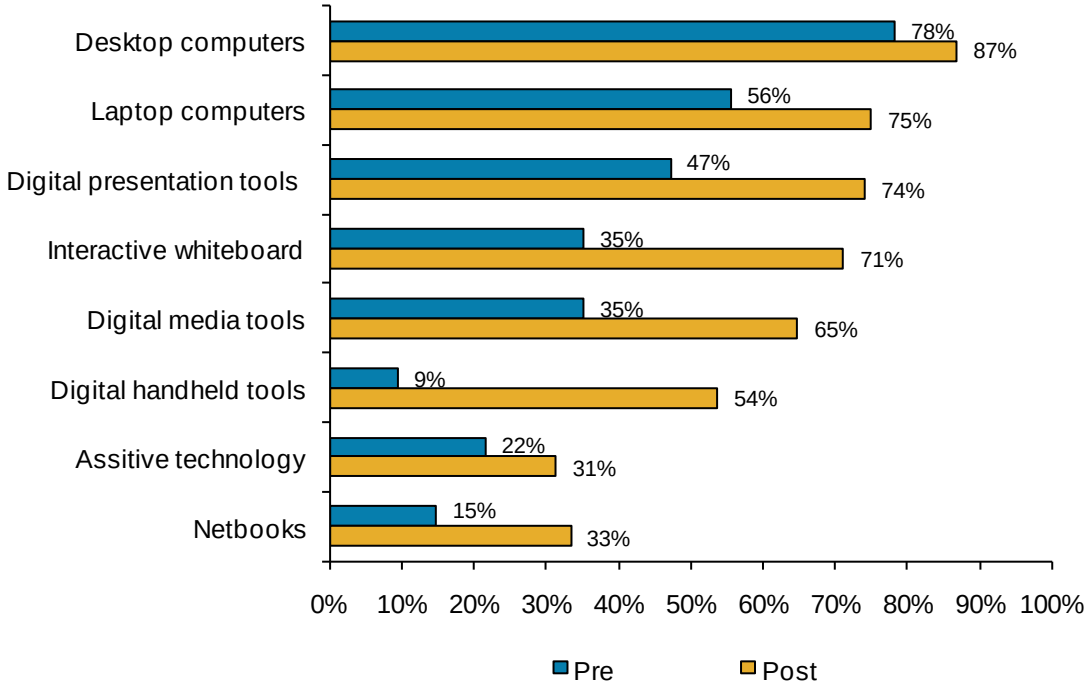
Figure 58. I feel comfortable using technology with my classroom.



Student Practice

Student use of various technologies, as reported by TLC teachers in the Educator Survey (n=55), aligned with the technology resources being utilized by teachers in their instruction. As with teachers, the most notable increases in student usage were seen among interactive whiteboards and digital technologies (see Figure 59).

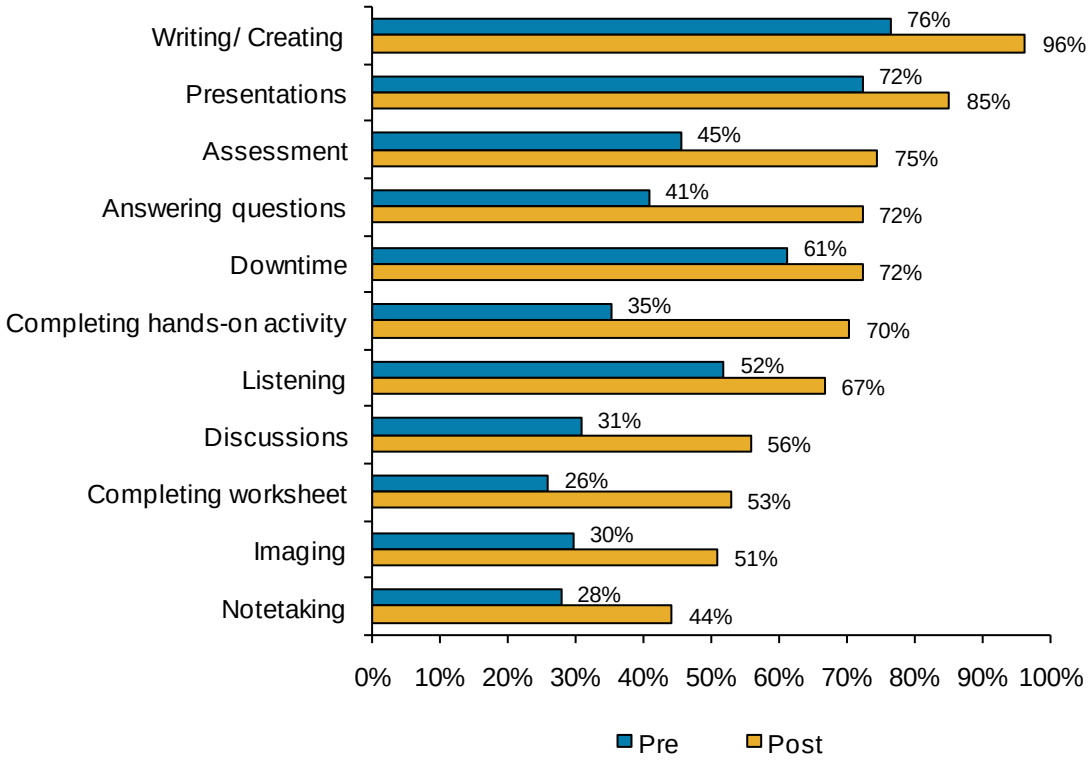
Figure 59. I design instruction that requires the use of these technologies by the student*



*The number of responses ranged from 51 to 55 due to missing data.

The majority of TLC teachers (69.1%) had their students use the abovementioned technologies for learning multiple times per week, compared to just 36.4 percent before the grant. Post-grant, teachers reported higher percentages of students using technology for particular activities. Most notably, the percentage of students using hands-on activities doubled over the course of the grant period (see Figure 60).

Figure 60. For what activities did/do your students use technology?*

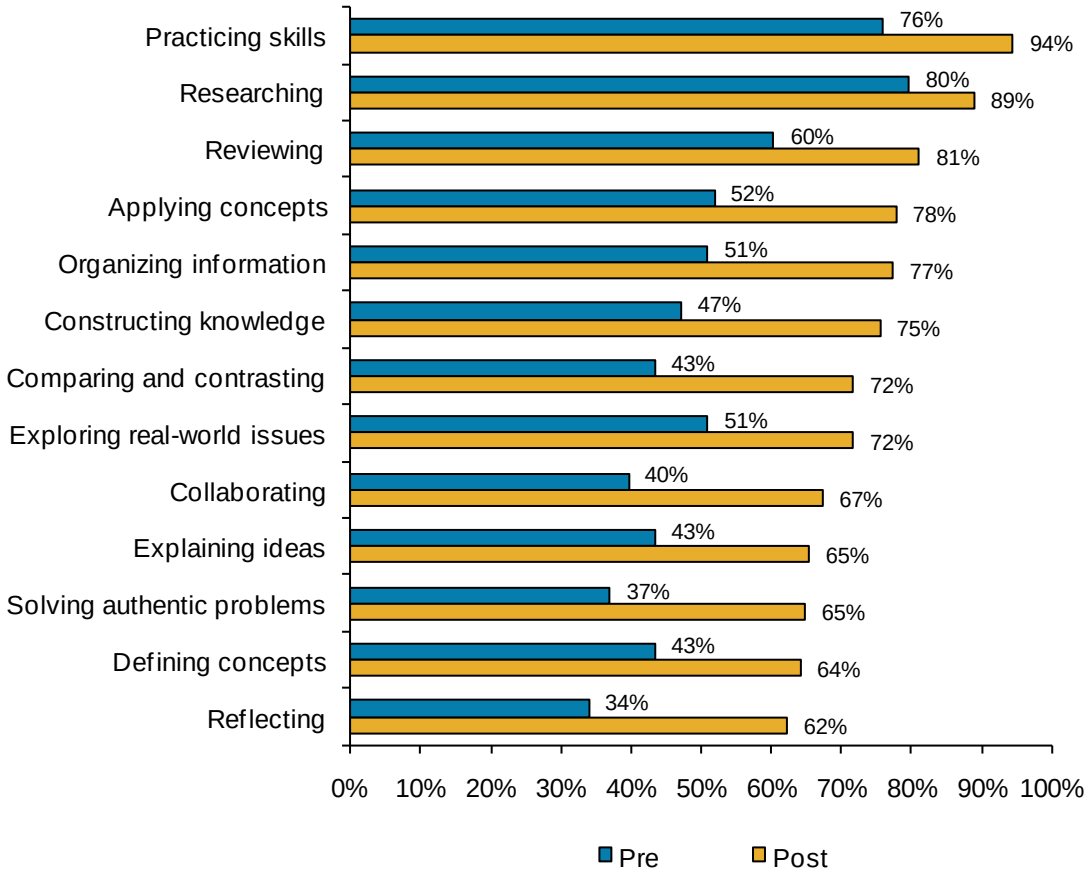


*The number of responses ranged from 52 to 55 due to missing data.

TLC teachers used technology for multiple purposes with their students (see Figure 61). While more basic objectives like practicing skills and reviewing were most commonly cited post-implementation, higher-order skills like collaborating, comparing/contrasting, solving authentic problems and reflecting had been addressed by a substantially larger percentage of TLC educators post-implementation. One project manager on the NH Case Study Report wrote:

> Students were meant to benefit directly from this grant and I believe that they did. The plan for them was a higher level of engagement in the content through the use of the integration of this technology. The focus of this project leaned heavily on the practices encouraged through the higher order thinking skills.

Figure 61. For what purposes did/do your students use technology?*



*The number of responses ranged from 52 to 54 due to missing data.

Among the schools that received a TLC grant, only one site had not established student accounts on their network. Despite this breadth of account distribution, only three schools (7.1%) allowed their students to regularly send and receive email and students at just two schools (4.8%) could access their accounts outside of school. However, many schools (43.6%) allowed their students unlimited storage space.

Among TLC recipients that responded to the NH School Technology Access Survey, more than half (56.8%) indicated their schools purchased online distance-learning content for students to supplement classroom learning; venders included *OdysseyWare* (n=5), *Grolier Online* (n=4), *Discovery* streaming (n=3), and *PLATO Learning*. Further, 65.8 percent of TLC schools used an online course management system for posting materials and assignments (greater than half of which – 64.0 percent – reported their systems were hosted in-house); among these schools, participants most readily cited *Moodle* (68.0%) for file management, followed by *Edline* (16.0%) and *Sakai* (12.0%). Likewise, among schools with digital portfolio solutions (52.5%), teachers commonly used *Moodle* (28.6%), *Sakai OSP* (23.8%), *Mahara* (23.8%), or simple network folders/shares (33.3%).

School Culture & Attitudes

TLC educators expressed an increasingly positive collective outlook on the utility and prominence of technology throughout the grant period. Firstly, teachers became less likely to hold negative attributes towards technology use regarding time and classroom management. Post-grant, teachers less frequently indicated that planning lessons with technology was more time consuming than planning lessons without (49.1% post, 63% pre), and about two-thirds of teachers felt that classroom management was *not* more difficult when technology was involved. 69.2% post, 64.8% pre).

While nearly all TLC teachers agreed that instructional technology improved learning (96.2% post, 90.9% pre), those who *strongly agreed* with this statement increased by 23.1 percent (55.8% post, 32.7% pre). Likewise, the majority of participants found that using technology improves their instructional effectiveness (92.3% post, 76.4% pre), with an increase of 26.4 percent of those who *strongly agreed* (50.0% post, 23.6% pre).

Nearly all teachers believed their school and district administrators were interested in their using technology effectively with students (92.2% post and 84.6% post, respectively). Districts also indicated high levels of the leadership capabilities of principals and district administrators on the NH STaR Chart (*M*=2.84 out of 4). Two NH Case Study Report project managers also cited administrative support as integral to the successes they found with the grant. For example, one project manager wrote, "I can attribute the success of the project to a well organized plan. In addition, the presence of enthusiasm and open mindedness on the part of the participants, both teachers and administrators was crucial to make this work."

Post-implementation, 94.1 percent of educators reported they assist one another in developing their technology skills (up from 74.1% pre-implementation), and the frequency of sharing ideas for using technology in ways that enhance learning increased by 22.3 percent for those who share their ideas once per week or more (64.2% post, 41.9% pre).

Barriers and Facilitators to Project Implementation

All four TLC project managers reported on the NH Case Study Report that spreading knowledge among schools and teachers was among the most predominant planning challenges. One project manager explained that "the biggest challenge was to take limited funds and impact the most students. The use of online/free Web 2.0 tools was beneficial and the ability to collaborate with the other centers and their grant recipients gave us all an edge in reaching/sharing content." Another added, "Bringing a diverse group of teachers and administrators together to share their experiences and still learn in a differentiated way from one instructor using one tool was a challenge."

Issues also emerged for project managers with training during the implementation stages, including teacher and principal cohorts who would not attend or adhere to training. One project manager noted on the NH Case Study Report that while some teacher leaders succeeded with the initiative, others felt isolated and not fully integrated into the community of practice. However, two project managers found success with motivated, enthusiastic instructor cohorts. One project manager explained that "the presence of enthusiasm and open-mindedness on the part of the participants, both teachers and administrators, was crucial to make this work. It was a large

commitment, specifically for teachers, and they stepped up to the plate!" Organization and planning were also keys to successful implementation for at least two of the four professional development centers who responded to the NH Case Study Report.

Two project managers would also like to seek out means for increasing accountability in areas of training and curriculum integration, while another two would like to see less Intel-specific components in their resources and development, as one project manager explained, "After using the Intel 'Thinking with Technology' Program for two years, I would not consider using it again. There are infinite Web 2.0 tools whose quality and value are greater and less cumbersome to use. I would take advantage of using those." This project manager recommends of future rollouts: "I would also limit monetary stipends - true educators are in this for their students and to build their own personal learning networks."

RQ2: To what degree are these technology-rich settings encouraging mediating outcomes for students, including interactive learning, higher-level thinking skills, and student engagement?

TLC educators reported notable gains in their perceptions of technology's capacity to augment student learning and their efforts to use technology for various interactive student activities. They also reported increases in student engagement and ICT competency over the course of the grant period.

Impact of Technology on Student Engagement

While nearly all TLC teachers felt students are both motivated to complete tasks and engaged when using technology pre-implementation and post-implementation, teachers increasingly found students to be on-task with technology at the end of the grant period (see Figures 62-64).

Figure 62. Students are motivated to complete tasks when using technology

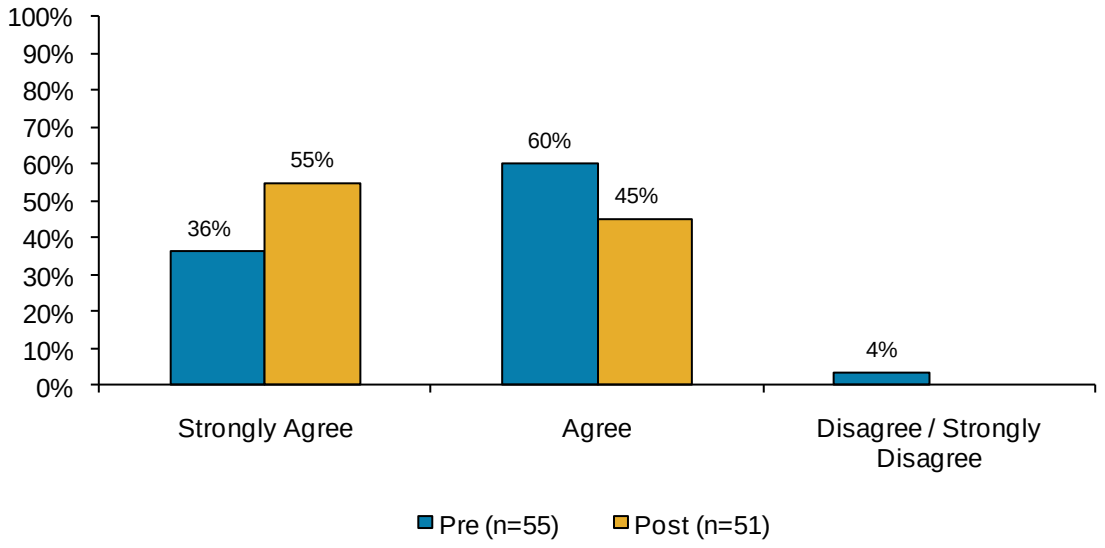


Figure 63. Students are on-task when using technology

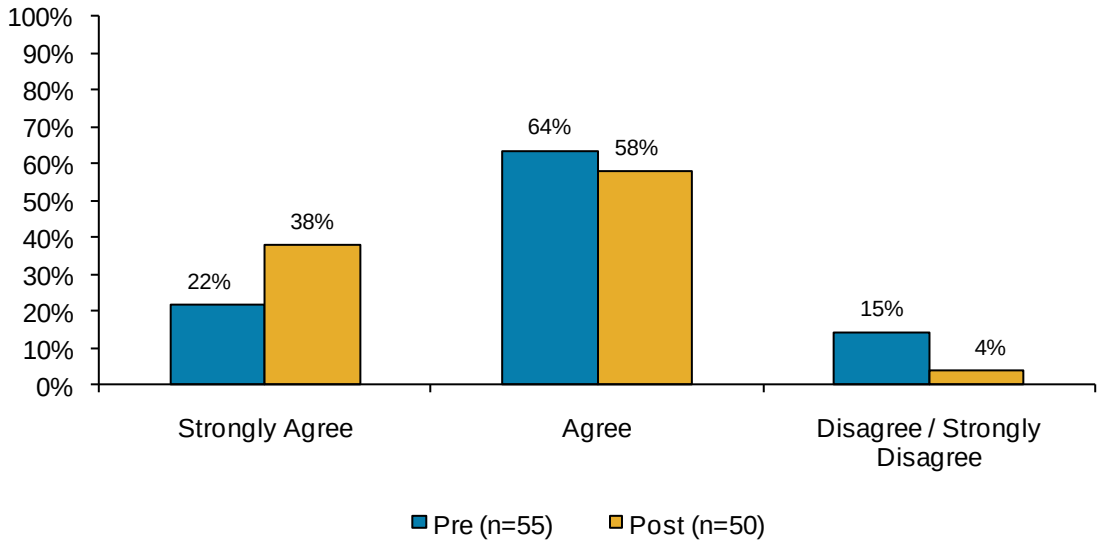
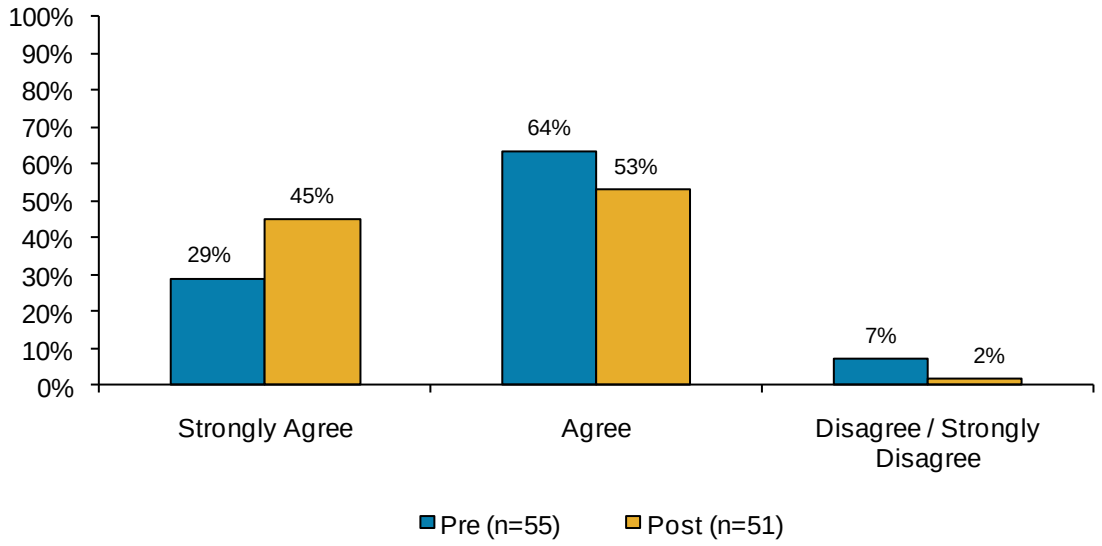


Figure 64. Students are engaged when using technology

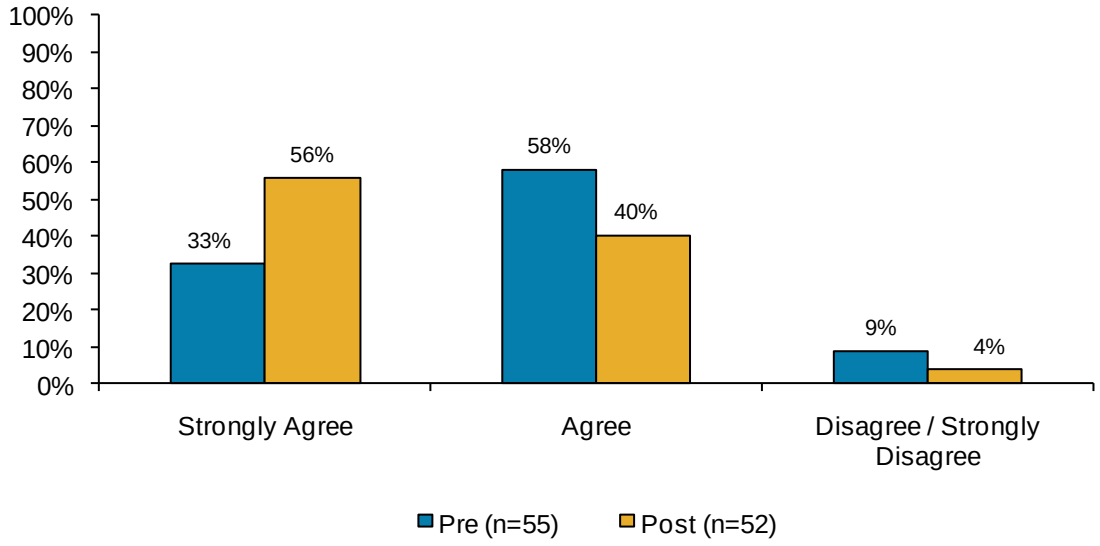


Impact of Technology on Interactive Learning and Higher-Level Thinking Skills

As reported above under RQ1, students at schools that received a TLC grant used technology for complex, open-ended activities, such as writing/creating, developing/delivering presentations, and researching. However, relatively low-priority tasks – like "downtime" exercises, practicing skills, and reviewing – were also readily pursued with the technology, as well as "completing worksheets." Nevertheless, as all kinds of instructional activity increased among TLC classrooms, this is perhaps a testament to technology's integration in all aspects of teaching and learning, both didactic and constructivist.

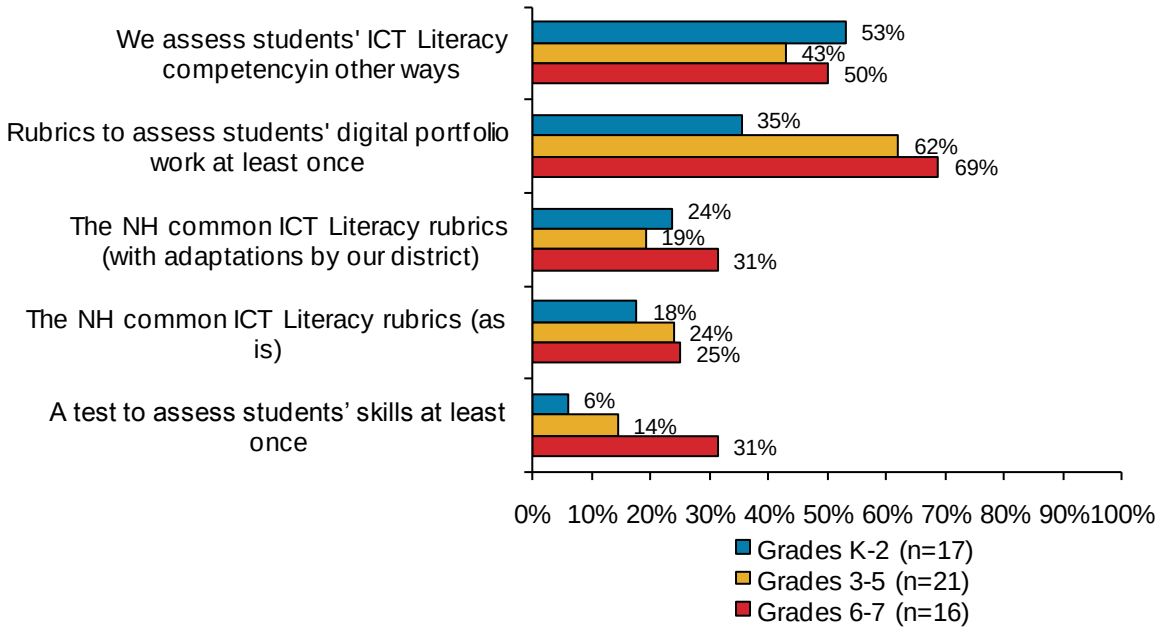
Furthermore, teachers' belief that student learning benefits from instructional technology had grown since the initiative's inception (see Figure 65), especially in regards to how strongly they believed this to be the case. Whereas the majority of teachers only agreed with the statement that "technology in instruction improves learning" pre-grant, a similarly sized majority *strongly agreed* with the statement post-grant.

Figure 65. I believe using technology in instruction improves learning



In looking specifically at students' ICT literacy competencies, as indicated on the NH School Technology Survey, TLC schools most frequently reported assessing students' in grades K-7 using rubrics for assessing students' digital portfolio work and "other" ways (see Figure 66).

Figure 66. Ways TLC schools are assessing students' ICT literacy skills in Grades K-7



Nevertheless, among the 15 TLC schools that reported eighth grade student enrollment totals for the 2010-11 academic year, respondents reported that over 94 percent of their students met the six ICT components (see Table 21) – perhaps limiting the need to facilitate alternative supports and assessments in these areas. In contrast, districts were more modest in their assessment of students' ICT competencies in the NH STaR Chart, as patterns of student use was rated, on average, as *developing* (*M*=2.50 out of 4).

Table 21. ICT competency attainment of eighth grade students at TLC schools, 2010-2011[36]

ICT competency requirement	n	8th Grade Enrollments 2010-2011 (Mean)	# of 8th Graders Meeting competency Requirements (Mean)	% of 8th Graders Meeting Competency Requirements (Mean)
Technology operations and concepts	15	79.9	76.9	96.2%
Research & information fluency/research tools	15	79.9	76.7	95.8%
Communication & collaboration/communication tools	15	79.9	76.5	95.8%
Digital citizenship/social, ethical, human issues	15	79.9	76.5	95.8%
Creativity & innovation/productivity tools	15	79.9	75.8	95.3%
Critical thinking, problem solving, & decision making	15	79.9	73.9	94.1%

[36] A 16th school had also reported its total 8th grade student enrollment, though did not provide any information on subsequent ICT literacy attainment.

Note: Percentages represent averages derived from calculations at the individual school level and would not, therefore, align exactly with percentages derived from the mean numbers of 8th graders provided in the table.

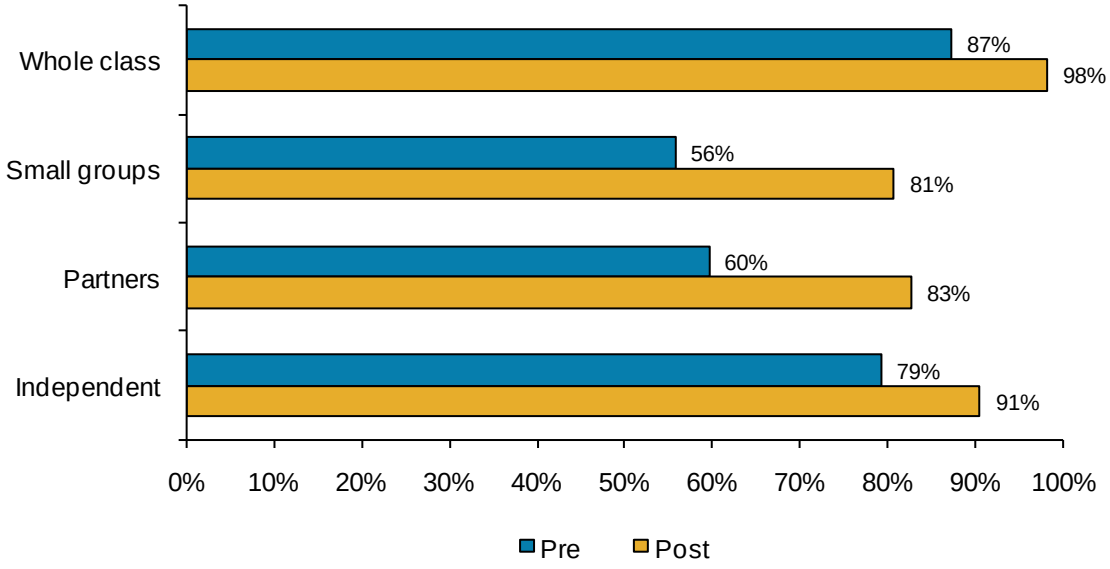
RQ3: To what degree does the provision of technology tools translate into real opportunities for students to collaborate and connect with new content?

Teachers are readily pursuing multiple technology-enabled activities with students, including expanded opportunities for collaboration and connections with new content. Teachers also reported an increase in hands-on activities, creation and presentation. However, while students learned and explored individually or in small groups during instructional time, teachers are predominantly guiding the activities.

Technology use among student groupings

Teachers indicated the types of student groups present when using technology in their classrooms. Post-implementation, technology was used more frequently for all types of student groupings, with percentage increases ranging from 10.9 to 25.0 percent (Figure 67). Most notably, the largest increases were in technology being used for small groups and partner work, in which students most often need to collaborate.

Figure 67. Student groupings present when using technology*



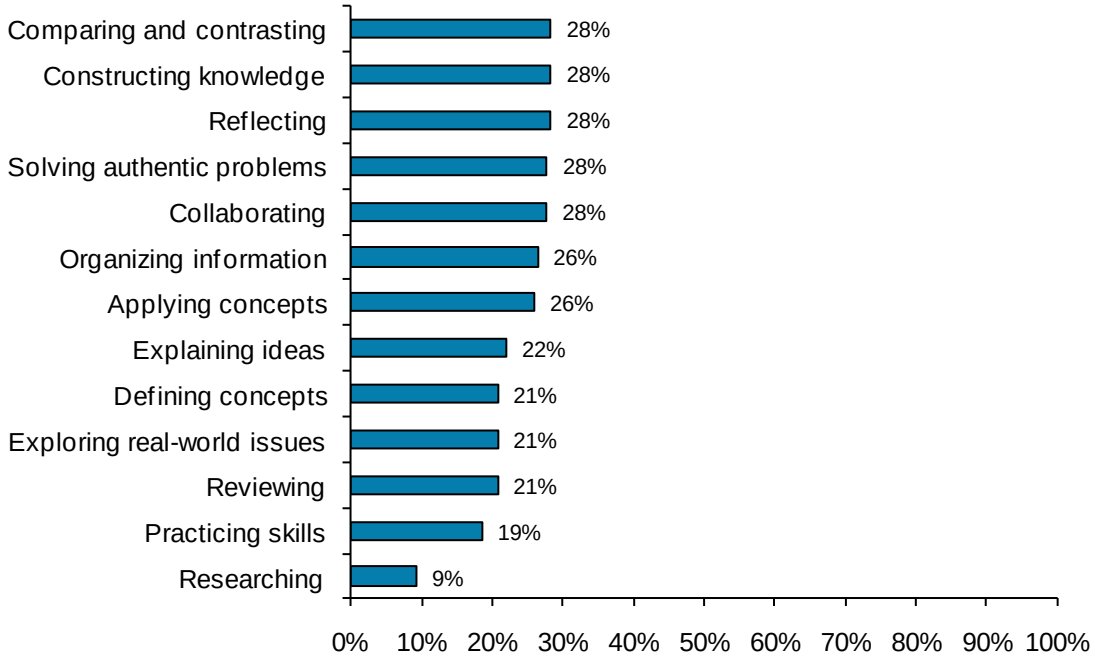
*The number of responses ranged from 52 to 55 due to missing data.

Tech applications promoting collaboration and connections to new content

Teachers reported students using technology for a variety of purposes, with collaboration increasing by 27.7 percent from pre-implementation to post-implementation (see Figure 68). Several student technology uses that also increased may lead to additional ways for students to connect to new content (e.g., constructing knowledge, solving authentic problems). Also, teachers often reported growing opportunities for hands-on activities, creating, and presenting.

Nevertheless, students are encouraged to pursue multiple purposes with the technology, and teachers reported increased opportunities for collaboration and multiple ways for students to connect to new content (e.g., constructing knowledge, solving authentic problems).

Figure 68. Change in teachers' reported use of technology purposes by students (from pre to post)*



*The number of responses ranged from 52 to 54 due to missing data.

The ICT competencies reported in RQ2 above show students were successfully navigating ICT resources for purposes of *communication and collaboration* (see Table 21). Also, the impact of technology on the teacher's role was *developing* (*M*=2.50 out of 4), according to administrators' ratings on the NH STaR Chart. This indicates that learning was still largely facilitated by the teacher and not fully student-centered. Nevertheless, feedback reported on the NH Case Study Report indicate higher levels of student engagement, facilitation of higher-order thinking skills, and use of online learning and other strategies as part of a 21st century learning approach.

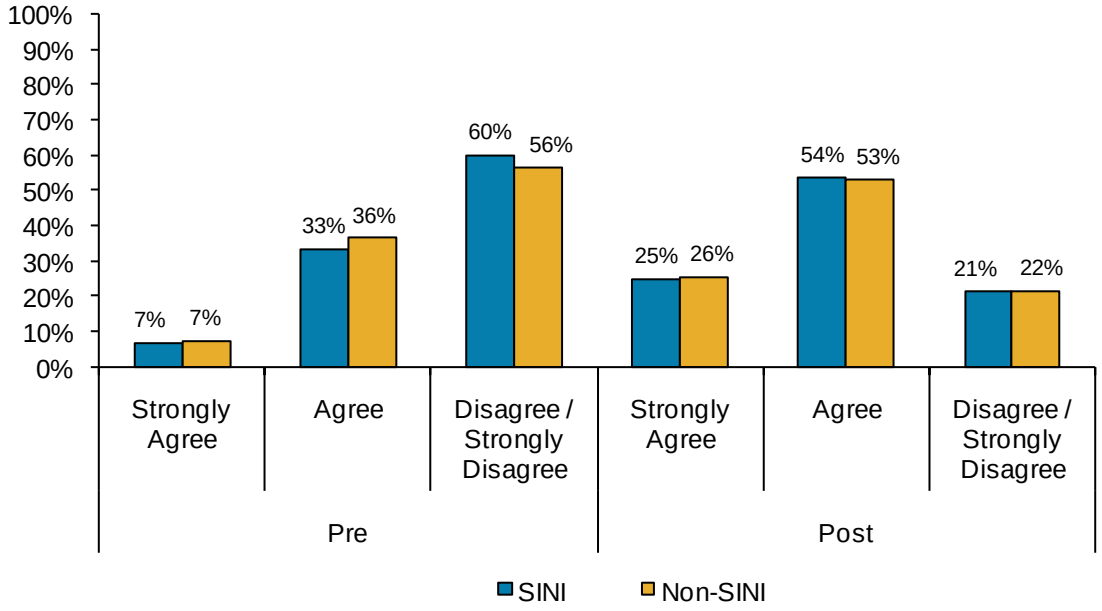
RQ4: How are new technologies and resources serving students of various groups, including those with the highest need?

To assess the impact of the TLC grant on different groups of students, schools participating in the grant were separated into two groups: schools in need of improvement (SINI) and schools not in need of improvement (non-SINI). Of the 47 schools that received a TLC grant, 27 were SINIs (see Table 30 in Appendix 6). The Educator Survey was completed by 30 teachers from SINIs and 25 teachers from non-SINIs. Teachers in both types of schools benefitted from the grant in helping them use technology to personalize learning activities, however, there were no differences between the survey responses of SINI teachers and non-SINI teachers either before or after the grant period.

Utilizing digital tools to meet individual student needs

Prior to the grant, fewer than half of SINI and non-SINI educators felt they were able to use digital tools to personalize learning activities and meet individual student needs (40.0% and 43.7%, respectively). Post-grant, educators reported higher levels of agreement (78.6% SINI and 78.4% non-SINI), however, there were no notable differences in the percent change of agreement/disagreement between the two groups over the grant period (see Figure 69).

Figure 69. I am able to use digital tools to personalize learning activities to meet individual student needs.



*The number of responses for non-SINIs ranged from 23 to 25, and 28 to 30 for the SINIs.

One project manager cited the benefits of the grant's training content and opportunities on the NH Case Study Report, specifically training related to differentiated, needs-based instruction. As indicated among schools' professional development needs in RQ5 below, differentiating instruction was identified as a priority in future opportunities for training and growth.

RQ5: How are grantees doing in terms of training teachers not only how to use technology but also how to translate their new skills into practice in their teaching?

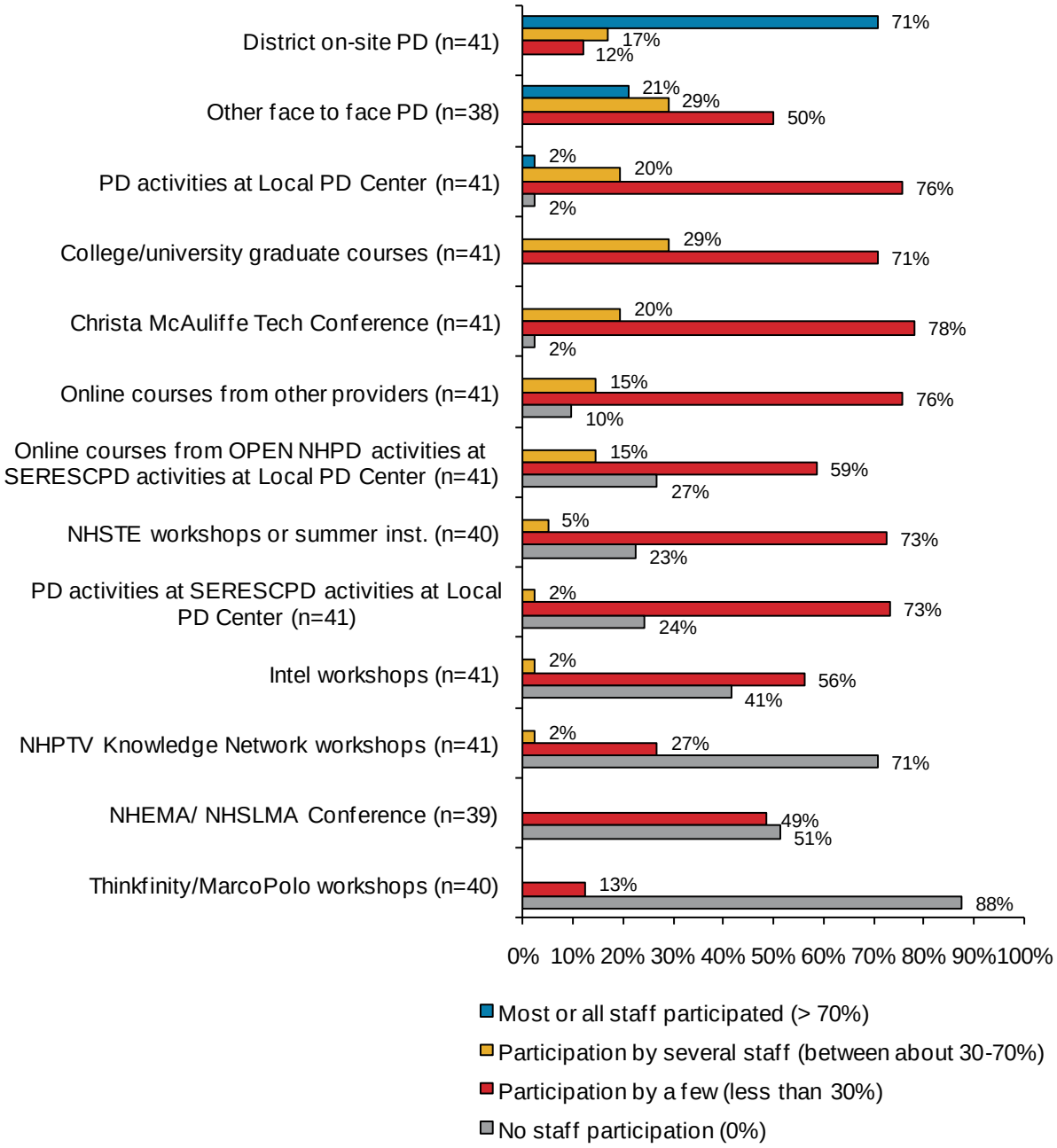
TLC educators have found notable successes with their progress in utilizing technology for teaching and learning, largely due to their training opportunities to date. While teachers made substantial gains in their comfort and proficiency with the resources themselves, district administrators identified further areas of need that address more sophisticated and complex next steps in teachers' technology use (e.g., using technology for various assessments, alignment with core curricula, improvements in student literacy skills).

Participation in Training Activities

Educators and administrators provided feedback on the training they have participated in to date, as well as what they perceive to be additional professional development needs.

Schools predominantly reported that most or all of their teachers received training from district on-site professional development (70.7%). Administrators also reported that many teachers participated in college/university graduate courses (100.0%), activities at a local professional development center (97.6%), the Christa McAuliffe Tech Conference (97.6%), or other face-to-face professional development (100.0%). Far fewer teachers received professional development from Thinkfinity/MarcoPolo or NHPTV Knowledge Network workshops (see Figure 70).

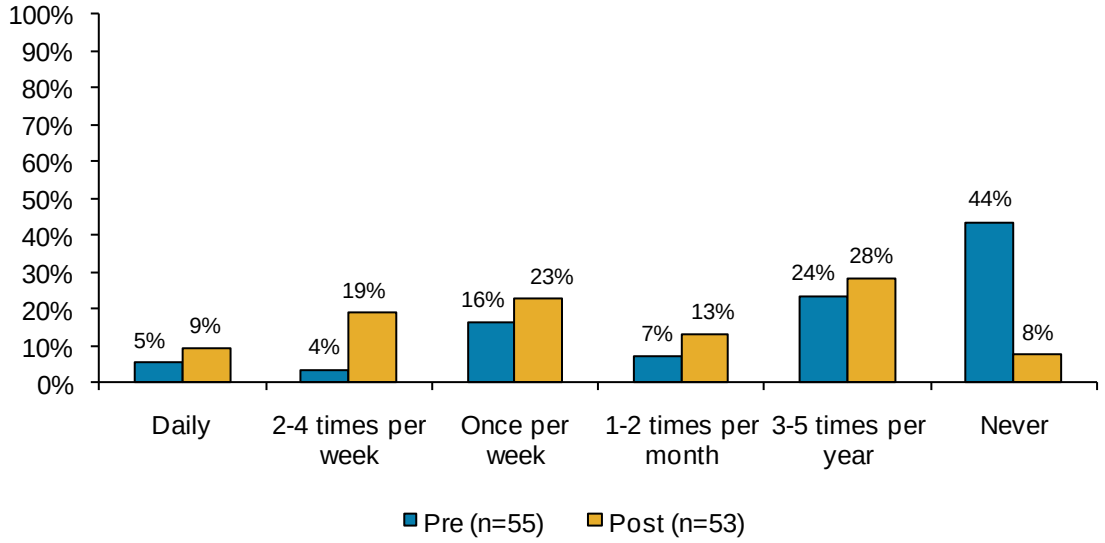
Figure 70. Staff participation in professional development or training[37]



TLC educators were more likely to have participated in an OLC for professional development after the grant ended. While 44.0 percent had never participated in an OLC before the grant period, only eight percent had not done so at the end of the grant period (see Figure 71).

[37] This figure represents school-wide participation in professional development.

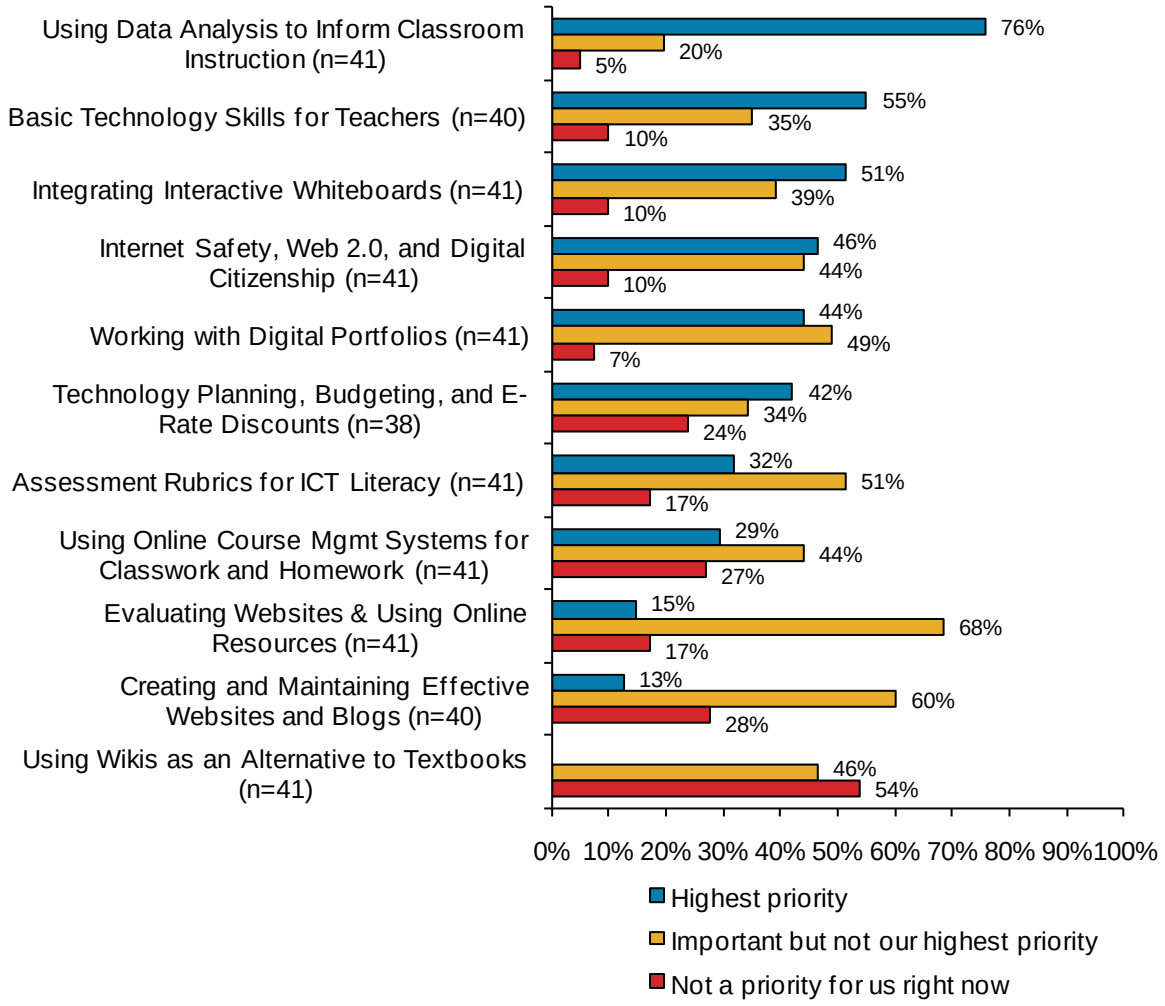
Figure 71. Frequency of teacher participation in online learning communities for professional development



Professional Development Content and Teachers' Training Needs

Administrators rated the importance of various technology professional development topics for their school, and 75.6 percent indicated that *using data analysis to inform classroom instruction* was the *highest* priority. The majority of administrators also reported that basic technology skills for teachers and integrating interactive whiteboards are high priorities (55.0% and 51.2%, respectively). Notably, using wikis as alternatives to textbooks was *not* a priority at any level for half of schools (see Figure 72).

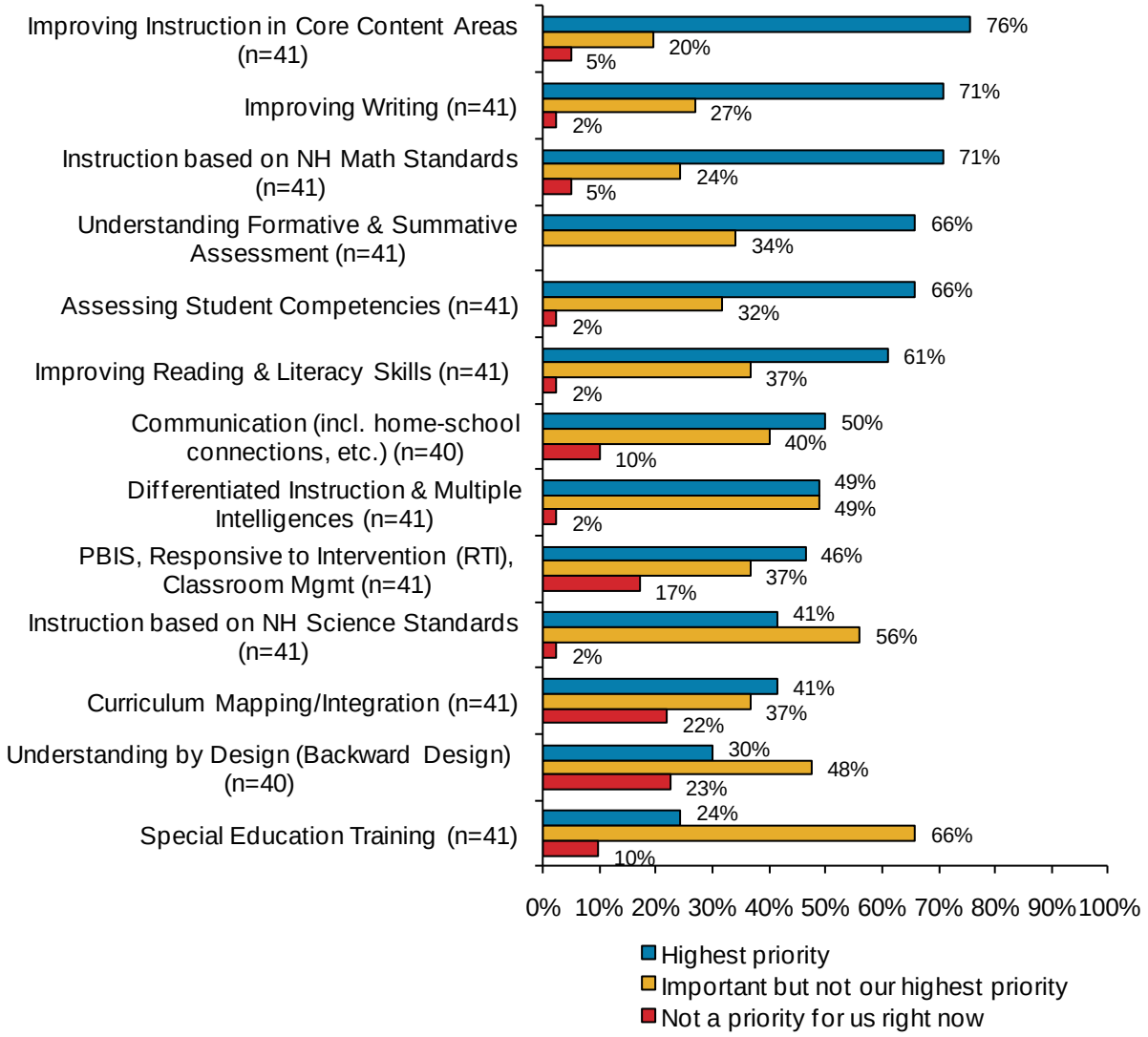
Figure 72. Teachers' need for professional development of technology topics



Administrators also rated professional development topics outside of technology. The majority of administrators indicated the following as the *highest* priorities: improving instruction in core content areas (75.6%), aligning instruction with NH math standards (70.7%), improving student writing (70.7%), understanding assessments/assessing student competencies (65.9%), improving reading/literacy skills (61.0%), and acquiring basic technology/integration skills for teachers (53.7%). Notably, understanding various assessments was important on some level to all schools, and assessing student competencies, improving instruction in core content areas, improving writing/reading/literacy skills, differentiating instruction and aligning instruction to NH Science Standards were important to all but one school. Working with data analysis and alignment to NH math standards were important to all but two schools (see Figure 73).

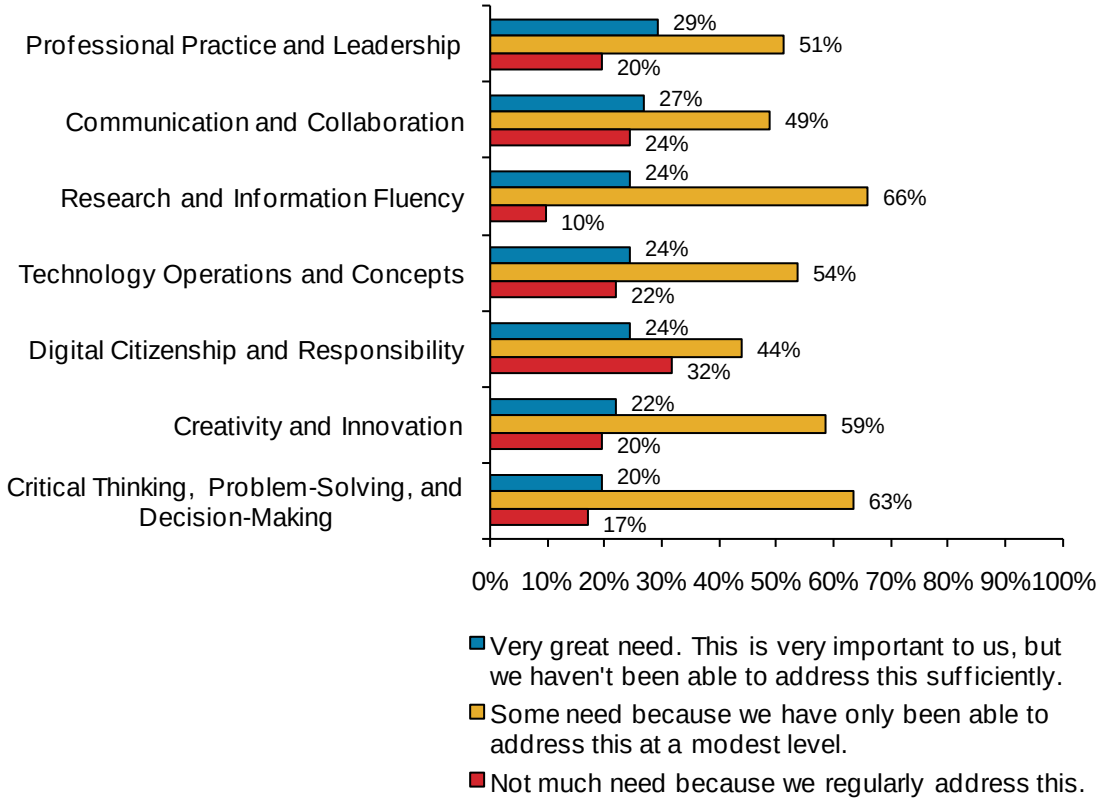
On the whole, many topics reported as *highest* priorities were content-based training (e.g., improving instruction in core content areas, improving writing, instruction based on NH math standards), indicating that administrators' felt teachers need professional development in areas that would directly impact students' skill levels (e.g., writing, math).

Figure 73. Teachers' need for professional development of non-technology topics



Topics within the NETS-T were regularly addressed by 9.8 percent to 31.7 percent of schools, depending on the topic. Most cited *some* or *very great* need for professional development on research and information fluency (90.2%; see Figure 74). According to administrators' average rating on the NH STaR Chart, educators' technology competencies (or capabilities) are *developing* in this area (*M*=2.59 out of 4).

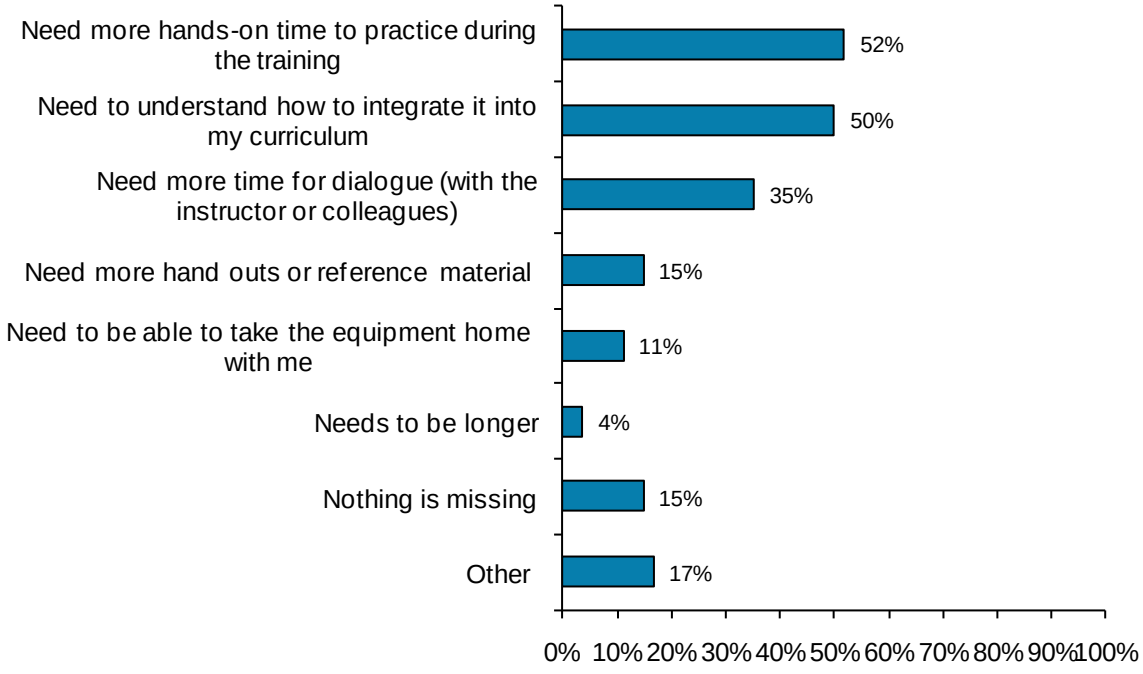
Figure 74. Teachers' need for professional development in NETS-T content areas (n=41)



Districts rated the content of their professional development opportunities as *developing* (*M*=2.84 out of 4). On average, districts also rated themselves as *developing* in their models of professional development (*M*=2.66 out of 4). NH Case Study Report feedback among four professional development centers cited some issues with training, particularly certain teacher and principal cohorts who would not attend or adhere to training schedules. Otherwise, project manager feedback on the professional development offered was positive, with opportunities for modeling (i.e., differentiated instruction), project-based strategies (i.e., via Intel), building on content areas, and hands-on experiences beneficial to teachers' technology integration.

TLC educators cited additional needs they would like to see addressed by professional development, most prominent of which were more hands-on time to practice with the resources and better understanding of how to integrate technology into their curricula (see Figure 75). It is also important to note that the majority of TLC administrators (85.4%) reported on the NH School Tech Access Survey that teachers are provided with time during regular school hours for these professional growth opportunities, including technology integration.

Figure 75. What aspects of training do you feel are missing from current trainings? (n=54)



Sustainability for Continued Technology Integration

Districts reported on average nearing *proficient* levels (*M*=2.81 out of 4) in establishing a long-term vision for technology integration. Two project managers cited on the NH Case Study Report that continual professional development opportunities are integral to their sustainability plans, particularly in exposing teachers to the latest innovations and establishing a domino effect of "technological fluency" from teacher to student. Continued pursuit of funding and participating in complimentary projects was cited by one project manager.

Commonly cited strategies on NH Case Study Reports for sharing project impact include incorporating outcomes in their reporting (i.e., to superintendents) and sharing experiences with educators in other professional development/program opportunities.

2. Conclusions

The section that follows presents conclusions based upon the interpretation of findings across the five research questions.

RQ1: How well are school staff members turning classrooms into technology-rich learning environments, fully equipped with hardware, software, and rich digital resources for learning?

TLC teachers pursued a variety of technology-enabled activities with students. They reported using an assortment of emerging technologies, such as digital handheld devices and online course management/digital portfolio systems. In doing so, teachers reported increases in more

hands-on, constructivist activities in their classrooms (e.g., research, multimedia/graphical presentations and simulations).

TLC educators were dedicated to establishing a community of practice around technology-enhanced instruction. While 58.2 percent of TLC educators had previously collaborated with colleagues on enhancing instruction via technology a maximum of once or twice per month, the majority (64.2%) came to do so at least weekly post-grant. Ultimately, teachers were far more likely to assist their colleagues in developing their technology skills, share strategies with one another, and construct shared ideas about areas of growth moving forward at the conclusion of the grant than prior to the grant.

TLC teachers ultimately felt more comfortable and confident with using technology for student learning. Likewise, the percentage of teachers who *strongly agreed* that *using technology increases my instructional effectiveness* more than doubled at the conclusion of the grant. Also, nearly all teachers felt comfortable and proficient with technology. They were readily able to design lessons around technology and use it to personalize lessons for individual learning needs.

RQ2: To what degree are these technology-rich settings encouraging mediating outcomes for students, including interactive learning, higher-level thinking skills, and student engagement?

As noted in RQ1, teachers pursued a variety of activities with students and subsequently ventured into a number of hands-on opportunities for student learning. Students readily grasped ICT competencies, and teachers increasingly reported that students were more engaged, motivated, and able to stay on task when using technology.

However, current practices suggested teachers could use more direction for augmenting higher-order thinking activities. As teachers continue to hone their technology-enhanced teaching practices, providing teachers with professional development on technology use for interactive learning or higher-level thinking skills may be valuable.

RQ3: To what degree does the provision of technology tools translate into real opportunities for students to collaborate and connect with new content?

Teachers reported increased opportunities for collaboration and multiple ways for students to connect to new content (e.g., constructing knowledge, solving authentic problems), as well as increases in students' collaboration and exploration either individually or in small groups during instructional time. In addition, administrators reported that most eighth graders (95.8%) met the ICT standard of *communication and collaboration.*

RQ4: How are new technologies and resources serving students of various groups, including those with the highest need?

Both SINI and non-SINI educators reported increased abilities to use digital tools to personalize learning activities, and virtually no difference was noted between these SINI and non-SINI educators. With additional professional development and time to fully integrate technology into instruction, teachers may become even better equipped to individualize instruction to students.

RQ5: How are grantees doing in terms of training teachers not only how to use technology but also how to translate their new skills into practice in their teaching?

Administrators reported that many teachers participated in on-site professional development in 2010-11. On the whole, many administrators reported content-based professional development topics (e.g., improving instruction in core content areas, improving writing, instruction based on NH math standards) as the *highest* priorities. Eventually, these content-based training topics should lead to a direct impact on students' skill levels.

Also, administrators reported addressing some ISTE NETS-T areas in professional development, but several reported additional needs to address those areas. Teachers also recommended providing more hands-on time during professional development, as well as a need to better understand how to integrate technology into their curriculum.

D. Discussion of Exemplary Sites

Evaluators identified two potential "exemplar sites" in Fall 2010 whose project descriptions and preliminary data (from the Educator Survey and NH Case Study Report) showed strong promise of success. In identifying these projects, several characteristics, based on the research on instructional technology implementation, were used to determine which projects exhibit great potential to have positive effects on technology integration and student learning. Other sites' projects may well have held similar promise but went unidentified by evaluators due to limitations in those descriptions (necessary to assess project design quality) and in the project-level impact data collected and provided by grantees.

The characteristics used to identify the potential "exemplar sites" in Fall 2010 included the following:

- presence of a clear, concise project description that suggested school staff have a concrete plan for achieving their stated goals
- evidence of addressing common barriers to technology use such as access, technical support, and teacher efficacy with respect to technology
- evidence of the presence of effective professional development including provisions for gaining necessary technical skills and support (i.e., coaching or modeling)

In Spring 2011, final project-level data was examined for these grantees to determine (a) success in implementing activities and strategies that effectively infuse technology with curriculum and instruction, and (b) evidence of positive impacts on student learning.[38] Data from the NH Case Study Report and the Educator Survey was examined for both criteria. The following is a brief discussion of these two sites.

[38] From the report "purpose" of Evaluation Report Instructions provided by ED.

Oyster River School District

Oyster River described their project, *Exploring the Outside World with Digital Tools*, as an initiative in which high school and middle school students serve as science mentors for elementary school students in an exploration of a local river ecosystem.

An initial examination of Spring 2010 Educator Survey data (a retrospective pre-post survey) noted preliminary successes as a result of this project; however, the final matched sample (of teachers that completed both a Spring 2010 and Spring 2011 Educator Survey) included data for only two teachers for Oyster River. As examining two teachers' reported change is not methodologically sound, success in implementing activities and strategies that effectively infuse technology with curriculum and instruction could not be determined from Educator Survey data.

The project manager provided feedback on activities and strategies that effectively infused technology with curriculum on the NH Case Study Report. The project manager indicated that whiteboards and lessons on the Promethean planet web site provided interactive lessons to engage students with videos and dynamic web pages. Also, the project manager explained that students will used wikis; edited sound recordings; created podcasts, movies, and slideshows; and used Skype or webinars to "communicate with experts in the field of Science and Engineering."

Oyster River did report positive impacts on student engagement and use. Specifically, the project manager wrote, "We have seen student engagement increase from 80 percent to 99 percent by walk through observation tools. We have also seen student and teacher technology use increase based on walk through observations." However, these gains do not reflect any measured changes in student *learning* as of the end of the project.

Timberlane Regional School District

Timberlane Regional Middle School focused their efforts on training technology science coaches to assist other teachers to use technology for enhancing learning. Timberlane's grant project increased access to technology for science students, allowing them to use powerful tools to apply their classroom learning to real-world situations.

There was notable growth in the design of instruction around both teacher and student use of various technologies, namely: teachers' laptop use and students' netbook use (resulting in decreases of desktop usage among both groups) and digital handheld tools (50% increase in use among teachers and 75% increase in student use, from zero usage pre-implementation). Similarly, there was notable growth in teachers' perceived capacity to use technology to design lessons that meet instructional objectives, as all teachers ultimately agreed or strongly agreed that they were able to do so, compared to just 60.0 percent of teachers pre-grant. Ultimately, 100 percent of teachers found themselves able to use digital tools to personalize learning activities and meet individual student needs, compared to just one teacher (20.0%) prior to the initiative.[39]

The project manager reflected on strategies for infusing technology with curriculum and instruction in the NH Case Study Report, and noted the regular use of *United Streaming* and

[39] Data from Educator Survey represents five respondents.

Gizmos to engage students in interactive learning activities and create a home-school connection (as students can access the videos and subsequent activities from anywhere). *Gizmos* were particularly useful for simulating challenging topics, and for the ability to choose simulations at various learning levels for the same topic to differentiate instruction. The school's NH Case Study Report also cited opportunities to engage students in both collaborative and independent work:

> …[students] can take tests online and communicate with each other in a forum. They can also work independently…and use different websites to learn and assess themselves such as: Brain Pop, Explore Learning, Make A Graph, and Moodle. In Literacy we used netbooks to design, web and research science materials. The students had various activities throughout the year using the netbooks to expand their science literacy. In science we carried out simulations, watched excellent videos, had a variety of types of instruction, recorded data, wrote reports, researched questions, took quizzes with clickers, saw cells on freshly made slides, and made videos instead of documenting in writing.

In addition to all teachers reporting that students were engaged and motivated when using technology, the project manager reported impacts on students in the NH Case Study Report:

> Having technology allowed low-function children (i.e. those who have poor hand writing, those who broke an arm/hand/finger, etc.). Other gains included allowing children to research at a moment's notice and further their understanding of the content (i.e. looking up a definition to a word or providing instant answers to questions in the classroom).

The report continued on to discuss some informal assessments of student engagement using student response systems (i.e. clickers), *Moodle*, and online essays, forums or quizzes using sites such as *Brain Pop*, explaining that "students became more comfortable, confident and creative using technology." Students were found to write more using computers than pencil and paper, though their content may not have been substantially better. While "bigger words" were sometimes used, that may have been a result of using the spell check feature. The project manager who authored the Case Study did point out, however, that the "novelty of the technology has worn off and students are not as excited about using [technology] as they were in the beginning of the year."

Concluding Thoughts

As this current evaluation was intended to provide a state-wide analysis of evaluation activities measured using common instruments, it was beyond the study's scope to conduct site-level evaluations to determine exemplary site status. As a result of this and other limitations, despite Oyster River and Timberlane having been identified in Fall 2010 as exemplary based on their clear project descriptions, it is not possible to ascertain at this time the degree to which they have realized their promise. While the NH Case Study Report was most closely aligned to examine the ways teachers effectively infuse technology into the curriculum and evidence of impacts on student learning, evaluators were again relying on school-provided descriptions rather than direct measures of impact. Narratives provided by project managers were often anecdotal, and did not provide substantial evidence of teachers' activities/strategies or their impact on student learning (though student engagement was discussed). In conclusion, evaluators are not

positioned to make any final determination on the exemplary status of either site discussed above. In order to determine exemplary sites, future evaluations might consider collecting data in such a manner that progress or impact can be assessed between sites, as well as across sites.

VI. Recommendations and Lessons Learned

Presented below are recommendations and the supporting lesson learned based upon the findings and conclusions presented in prior sections.

Ensure there are strong technology infrastructures and technical support staff in place prior to implementation.
Many ARRA sites indicated infrastructure issues (e.g., Internet connectivity, electrical systems, data storage) as barriers to project implementation, though many also indicated that issues were resolved or improved upon throughout the ARRA grant. Some ARRA focus group participants recommended conducting an evaluation of building infrastructures to ensure they can support additional (and advanced) technologies. Also, providing sufficient technical support personnel (including technical staff and technology integrators) was identified as crucial by ARRA focus group participants and ARRA project managers completing the NH Case Study Report.

To the extent possible, address causes to minimize delays in the purchasing and deployment of new technologies.
Several ARRA and Mini-Grant recipients reported delays in their receipt and implementation of technology for the grants, which impacted professional development scheduling and implementation timelines. In addition, these delays may cause delays in progress, inhibit project goal attainment, and/or minimize project-associated outcomes. If delays are unavoidable, all efforts should be made to adjust the timing of professional development so that it occurs as soon as possible after the new technology has been received.

Ensure grantees effectively communicate the project goals and outcomes to all stakeholders.
Both teachers and administrators reported a variety of ways they plan to or have disseminated ARRA grant outcomes, and several stressed the importance of sharing this information with all stakeholders (staff members, school board, community members, students, parents, and others). Similarly, buy-in and commitment from stakeholders was identified in ARRA focus groups as crucial for project success, including clear communication (about professional development plans, technical issues, project timelines, etc.) and commitment among teachers/staff and administrators. In order to obtain teacher/staff buy-in, some ARRA sites also emphasized the need to involve teachers/staff in the planning process.

Capitalize on the increased appreciation for and excitement surrounding school technology integration for project sustainability.
ARRA educators recognized the utility of instructional technology and its benefits to both teachers and students, as various technology applications increased among all teacher cohorts. Practices and insights from ARRA participants confirmed these benefits, both anecdotally and in their perceived capacities and progress. While educational budgets continue to be tight, project managers must use the momentum provided by the ARRA grants to make the strongest possible case for fundamental, sustainable levels of technology acquisition and integration.

Continue to provide teachers with high-quality, relevant, focused professional development opportunities.
ARRA teachers and administrators often cited professional development as the key to a successful project. Many administrators at ARRA, Mini-Grant, and TLC schools reported *some* or *very great* for additional content-based professional development (e.g., improving student writing, improving instruction based on NH math standards). Several ARRA, Mini-Grant, and TLC administrators also identified a high need for additional professional development on *using data analysis to inform classroom instruction*. Also, some ARRA teachers recommended providing individualized or differentiated training in order to maximize the effect of professional development.

Continue to provide teachers and students with the positive support and encouragement needed to facilitate their technology implementation and use.
ARRA focus group participants cited technical and general school- or district-level support as both a barrier and a facilitator to project planning and implementation. Providing teachers positive learning environments or an encouraging culture may increase teachers' comfort and instill confidence when integrating technology into their curriculum. Several ARRA teachers and administrators recommended a "less is more" approach, indicating that it often takes time for teachers to feel comfortable with the new technology tools and to learn the most effective ways to incorporate them into the curriculum. Similarly, ARRA teachers advised others to implement the project in stages; be patient; readily use and prepare lessons with technology tools; and be committed to learning about the technology. Therefore, providing positive reinforcement and technical personnel to create an environment for teachers to learn and share with one another will increase teachers' comfort with and use of the technology.

Expand existing supports to facilitate nuanced applications of technology resources and higher-order instructional approaches.
More than a quarter of surveyed ARRA administrators reported a "very great need" for further teacher development in *communication and collaboration* and *digital citizenship,* while nearly all respondents cited at least some need for addressing *creativity and innovation*. Training specific to core content areas, data analysis, and the optimization of interactive whiteboards also remain priorities for further development. These targeted areas of need address more sophisticated and complex next-steps in their technology adoption, prompting future opportunities for PD provisions.

Provide additional assistance to schools in need of improvement (SINIs) for obtaining their full allocation of resources and identifying strategies for putting the resources to use.
While positive outcomes were identified among all ARRA participants, non-SINIs outpaced SINIs in some areas of growth. This suggests that opportunities exist to apply more targeted interventions aimed at closing gaps in technology application, teacher/student skills, and perceptions. As SINIs are at greatest risk of not meeting AYP goals, they stand to benefit the most from the improved learning outcomes that are expected to result from ARRA participation. SINIs did report implementing their technologies sooner than non-SINIs on average, which indicates that some effort has already been taken to provide SINIs with the equipment to assist in improving student achievement. However, some gaps in effects between these SINIs and non-SINIs suggest that more needs to be done to help these SINIs close gaps.

Budget and provide time for teachers to learn, plan and share information about new technologies.

ARRA teachers and administrators stressed the need for additional scheduled time for teachers to explore the new technology when implementing a technology initiative. Also, several ARRA teachers indicated that integrating technology into the curriculum initially "takes a lot of back-planning." Allowing time for collaboration has proven to be crucial for teachers in advancing their skill set and comfort in using and integrating technology into the curriculum. Some focus group participants suggested scheduling meetings for teachers to share ideas to enable teachers to learn different or more effective ways to integrate technology into the curriculum. A few other teachers pointed out that general sharing among teachers may lead to improved troubleshooting skills, as teachers may learn additional tips and tricks from their peers. A few ARRA sites also recommended that teachers learn from each other through classroom observations and discussions (both on-site and with other schools and districts), as well as from online sites or educational and/or instructional technology conferences. Also, some Mini-Grant project managers identified lack of time to integrate the technologies as an implementation challenge, so extending future project timelines for similar technology initiatives may be useful.

Encourage more discussions among educators about the benefits of allowing students to access the school network from home.

ARRA schools generally reported that students in grades K-8 have student accounts on their networks but few of the students can access these accounts at home or are permitted to regularly send and receive emails. Additionally, some ARRA teachers were frustrated by the fact that not all students are able to electronically complete homework or practice at home. While many of these barriers are difficult for the school to ameliorate, maximizing the extent to which students can work on a collaborative space on the school's network, regardless of time or location, should help to this situation. Expanded access to school-supported work spaces could open up new opportunities for student learning that are not limited to the school day; this would then provide a direct line of learning from the classroom to the home (and other out-of-school spaces). One way more teachers can provide this collaborative out-of-school teaching and learning space is by creating and maintaining class websites for communications with parents and students. Only one-quarter of ARRA schools require their teachers to provide a class website for communications.

Provide teachers will the skills needed to deliver challenging and engaging technology applications to students and experiment with new instructional practices involving technology.

While ARRA teachers reported increases in student engagement over the duration of the grant, students self-reported little change in their own engagement. This may be due to students being so comfortable with technology in general that they do not see themselves partaking in something new (or being challenged). Continuing to tweak and experiment with technology in teachers' instruction may help them maximize student engagement. Similarly, teachers should continue using technology to increase students' ICT competency skills, as the percentage of eighth graders who met each requirement ranged from 80.0 to 86.4 percent, as reported by ARRA administrators.

Provide schools/districts with guidance and tools (both short-term and long-term) to help them evaluate the impact(s) the technology is having on student achievement.
Nearly all ARRA teachers reported that using technology in instruction improves learning. However, data obtained from ARRA project managers and focus groups indicated that few sites have quantitatively examined the impact the new technology is having on student achievement. Most impacts mentioned were anecdotal in nature, and most sites commented on the positive impact the technology has had on student engagement. Few sites were able to provide measurable outcome data identifying the impact of the technology on student achievement.

Provide guidance to educators on best practices for using technology for differentiated learning.
During the focus groups, ARRA educators cited differentiation of instruction as one of the most effective uses of technology in the classroom. The technology offers the ability to reach different types of learners in new ways and "levels the playing field" for students. As teachers are working with students of varying abilities, it is critical that they understand how to use the technology tools to maximize the learning experiences of their students. Providing teachers with best practices and guidelines on the effective uses of technology for reaching a diversity of learners would ensure that students' are reaching their maximum potential.

Appendices

Appendix 1:
List of Acronyms and Abbreviations

List of Acronyms and Abbreviations

ARRA	American Reinvestment and Recovery Act
AYP	Adequate Yearly Progress
CACES	Capital Area Center for Educational Support
DINI	District In Need of Improvement
DSL	Digital Subscriber Line
ED	U.S. Department of Education
EETT	Enhancing Education Through Technology
ESEA	Elementary and Secondary Education Act
ICT	Information and Communication Technologies
ISDN	Integrated Services Digital Network
ISTE	International Society for Technology in Education
LESCN	Local Education Support Center Network
LoTi	Levels of Teaching Innovations
McREL	Mid-continent Research for Education and Learning
NCES	National Center for Educational Statistics
NCLB	No Child Left Behind Act
NECAP	New England Common Assessment Program
NETS-S	National Education Technology Standards for Students
NETS-T	National Education Technology Standards for Teachers
NH	New Hampshire
NHDOE	New Hampshire Department of Education
NWEA	Northwest Evaluation Association
OLC	Online Learning Community
OPEN NH	Online Professional Education Network New Hampshire
SAT	Scholastic Aptitude Test
SINI	School In Need of Improvement
STaR	School Technology and Readiness
Tech/Tech.	Technology
TLC	Tech Leader Cohort
TLCF	Technology Literacy Challenge Fund

Appendix 2:
Evaluation Timetable

Table 22. ARRA 21st Century Classrooms Timetable

ARRA	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug
	School Year 2009-2010						School Year 2010-2011											
Evaluation Contract Signed	■																	
Spring 2010 Instrument Development	■	■	■															
Spring 2010 Instrument Implementation	■	■		■														
Spring 2010 Data Analysis & Site-Level Reporting					■	■												
USDOE Reporting for School Year 2009-10							■	■	■									
Fall 2010 Instrument Development					■	■												
Fall 2010 Instrument Implementation							■	■										
Fall 2010 Data Analysis & Site-Level Reporting										■	■							
Spring 2011 Instrument Implementation													■	■	■			
Spring 2011 Data Analysis & Site-Level Reporting																■	■	■
USDOE Reporting for School Year 2010-11																■	■	■

Table 23. TLC Program/Classroom Technology Mini-Grants Timetable

TLC/Mini-Grants	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	July	Aug
	School Year 2009-2010						School Year 2010-2011											
Evaluation Contract Signed	■																	
Fall 2010 Instrument Development (includes retrospective pre-test and post-test)							■											
Fall 2010 Instrument Implementation								■	■									
Spring 2011 Instrument Implementation																■	■	■
Spring 2011 Data Analysis																■	■	■
USDOE Reporting for School Year 2010-11																■	■	■

Appendix 3:
Bibliography of References

Bibliography

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NHDOE RFP: http://www.nheon.org/oet/nclb/2009-10/TitleIID-Round8-RFP2009-10.htm

Partnership for 21st Century Skills website: http://www.p21.org/.

Appendix 4:
Evaluation Instruments

NH School Technology and Readiness (STaR) Chart

How to use this chart:
Assess your district levels for each row/item and fill in the appropriate level numbers in the last column of the chart.

About this chart
The NH STaR Chart was derived from the Massachusetts and Texas charts of the same name.

A strong district technology plan should reflect the elements in the chart. We recommend that local technology plan benchmarks be defined by the Proficient Tech level (3) of the following columns:

Teaching & Learning:	T&L2 - Patterns of Teacher Use
Teaching & Learning:	T&L5 - Patterns of Student Use
Professional Development:	PD2 - Capabilities of Educators
Administration & Support:	A&S2 - Technical Support
Administration & Support:	A&S3 - Curriculum Integration Staffing
Administration & Support:	A&S5 - Budget Allocated for Technology
Infrastructure for Technology:	IN2 - Students per Instructional Computer
Infrastructure for Technology:	IN3 - Internet Access
Infrastructure for Technology:	IN4 - E-Learning Environments
Infrastructure for Technology:	IN5 - LAN/WAN

This NH STaR chart is also used to provide guidance to the New Hampshire Department of Education about grant distribution by offering a common set of goals. There are several assumptions built into this work:

- That technology should be integrated into teaching and learning so that its use extends opportunities and potential for all students.
- That the effective use of technology involves the many elements specified in the chart by the 23 columns. Technology in education, used appropriately and effectively, is a complex set of interactions of people, materials, infrastructure and continuous support. It is not a single investment at one time.
- That the chart is reviewed and updated annually.
- The chart is "forward looking" because technology constantly changes and educators need to consider how these changes impact teaching and learning.
- The chart strikes a balance between what is reasonable in schools given the current funding and what is desirable given our goals for student learning and the communities' expectations.

Focus Areas / Levels of Progress		Early Tech	Developing Tech	Proficient Tech	Advanced Tech	Our District Levels
		1	2	3	4	
T&L 1	**Impact of Technology on Teacher Role**	Mostly teacher-centered lectures. Minimal student use of technology in instruction.	Mostly teacher directed learning. Students use technology to work on individual projects	Mostly teacher facilitated learning. Students use technology for cooperative projects in their own classroom.	Mostly student-centered learning, teacher as mentor/facilitator. Students use technology to communicate and collaborate outside the classroom.	
T&L 2	**Patterns of Teacher Use**	85% of teachers use technology as a productivity tool (e.g. e-mail, grades) and/or as a classroom supplement (e.g. drill and practice).	85% of teachers explore using technology to support curriculum goals (e.g. research, lesson planning)	85% of teachers use technology for research, lesson planning, multimedia and graphical presentations and simulations, and share technology uses with colleagues.	85% of teachers integrate evolving technologies that transform the teaching process by allowing for greater levels of access, interest, inquiry, analysis, collaboration, creativity, and content production.	
T&L 3	**Design of Instructional Setting**	Mostly computer labs or libraries; scheduled use only.	Labs, libraries, many classrooms; flexible scheduling.	Lab, libraries, all classrooms, and portable technology (e.g. wireless laptops or handheld electronic devices); flexible scheduling.	Seamlessly integrated throughout classes and all content areas. Technology is available anytime both in school and within the community.	
T&L 4	**Curriculum Areas**	Limited to teaching technology skills at different grade levels.	Use of technology is minimal in a few curricular areas across grade levels.	Integrated into most Framework curricular areas and activities at all grade levels.	Integral to all curricular areas at all grade levels.	
T&L 5	**Patterns of Student Use**	85% of students are developing some of the ICT literacy skills and artifacts as described in Ed 306.42.	85% of students show proficiency in some of the ICT literacy skills and artifacts as described in Ed 306.42.	85% of students show proficiency in all of the ICT literacy skills as described in Ed 306.42 and demonstrated within their digital portfolios.	All students show proficiency in all of the ICT literacy skills as described in Ed 306.42 and demonstrated within their digital portfolios.	
PD 1	**Content of Training**	Technology skills (email, word processing, internet browser use, etc.) for teachers' professional use.	Training encompasses more complex professional uses (district applications such as attendance and report cards, scanners, cameras) and curriculum integration strategies.	Training directly ties technology to its use in content areas and how to effectively manage it in the classroom.	Training focuses on modeling, mentoring and adopting new technologies as well as the integration of Universal Design and access considerations for all students.	
PD 2	**Capabilities of Educators**	10% meet ISTE and/or local district teacher technology competencies and implement them into the school environment.	30% meet ISTE and/or local district teacher technology competencies and implement them into the school environment.	60% meet ISTE and/or local district teacher technology competencies and implement them into the school environment.	90% meet ISTE and/or local district teacher technology competencies and implement them into the school environment.	

Focus Areas / Levels of Progress		Early Tech	Developing Tech	Proficient Tech	Advanced Tech	Our District Levels
		1	2	3	4	
PD 3	**Leadership and Capabilities of Building Principals and District Administrators**	Recognizes benefits of technology in instruction to improve learning outcomes for all students. Minimal personal use (email, word processing, internet browser use, etc.). Awareness of national standards for administrators.	Supports use of technology in instruction. Uses technology in daily work. Approaching proficiency of national standards for administrators.	Recognizes and identifies exemplary use of technology in instruction. Uses technology skills in daily work such as research and communication and models appropriately with staff. Provides constructive feedback to teachers on their technology use.	Promotes exemplary use of technology in instruction. Models and uses in daily work in communication, presentations, on-line collaborative projects, and management tasks. Develops a school culture that expects all teachers to use technology. Advocates in the community for the integration of technology in instruction. Expects all teachers to use technology well.	
PD 4	**Models of Professional Development**	Whole group, skill based training with minimal follow-up.	Whole group curriculum-based training with follow-up to facilitate classroom implementation.	Coaching, modeling best practices, district-based mentoring. Involvement in a development / improvement process. Study groups.	Creates a culture of inquiry, sharing and knowledge building. Anytime learning available through a variety of delivery systems (e.g. Just in time support, mentoring, peer observation).	
PD 5	**Levels of Understanding**	Most at entry or adoption stage (Students learning to use technology; teachers use technology to support traditional instruction).	Most at adaptation stage (technology used to enrich curriculum). Most beginning to use with students.	Most at appropriation stage (technology is integrated, used for its unique capabilities).	Most at invention stage (teachers discover and accept new uses for technology).	
PD 6	**Universal Access: Integration of Universal Design and Assistive Technology**	Emerging awareness of universal design and assistive technologies (hardware/software) limited to special educators; few examples across the district of universal design strategies or assistive technology used to promote access to the general curriculum.	Awareness of universal design and assistive technologies (hardware/software) by special educators & some general educators; universal design strategies or assistive technology used to promote access to the general curriculum demonstrated across all grade levels.	Awareness of universal design and assistive technologies (hardware/software) by special educators & most general educators; universal design strategies or assistive technology used to promote access to the general curriculum demonstrated across all grade levels; staff are designated to provide AT assessment, procurement, support (training) and maintenance.	Systemic adoption of universal design curriculum development strategies and the seamless integration of assistive technology to promote access to the general curriculum for all students; staff are designated to provide AT assessment, procurement, support (training), and maintenance.	

Focus Areas / Levels of Progress		Early Tech	Developing Tech	Proficient Tech	Advanced Tech	Our District Levels
		1	2	3	4	
A&S 1	**Vision and Planning**	Minimal technology plan; technology used mainly for administrative tasks such as word processing, budgeting, attendance, grade book.	The technology plan is approved by the School Board & supported by the Superintendent. The plan is collaboratively developed by key stakeholders (e.g., teachers, parents, community members, local business & individuals w/disabilities), guiding policy & practice. Addresses local district teaching & learning standards.	The technology plan is integrated into the district professional development and school improvement plans; used for internal planning, budgeting, applying for external funding and discounts. Teachers / administrators have a vision for technology use in support of student learning, teacher professionalism, and data management.	The technology plan & vision are focused on improving the success of all students based on needs, research, proven teaching and learning principles and is actively supported by the School Board and Superintendent. The plan is collaboratively developed, guiding policy & practice; updated at least annually.	
A&S 2	**Technical Support (hardware, operating system, network)**	Technical support call-in; response time greater than 24 hours. Problems cause major disruptions to curriculum delivery using technology.	At least one technical staff per 350 computers. Same-day technical support for infrastructure problems by call-in. Problems sometimes cause major disruptions to curriculum delivery using technology. Network Administrator.	At least one technical staff per 200 computers. Same-day in-classroom technical support available. Problems infrequently cause major disruptions to curriculum delivery using technology. Network administrator.	At least one technical staff per 150 computers for just-in-time support. Technical support is readily available on-site for both infrastructure and application problems. Problems do not cause major disruptions to curriculum delivery using technology. Network administrator.	
A&S 3	**Technology Integration Specialist**	No district level Technology Director. Local instructional technology support is inconsistent.	District level Technology Director. One-half instructional technology specialist per 60-120 staff.	District level Technology Director. Dedicated instructional technology specialist - one half person per 30-60 staff. Dedicated staff at district level for data management and assessment.	District Technology Director. Dedicated instructional technology specialist - one half person per 30-60 staff. Dedicated staff at district level for data management and assessment and to help produce integrated curriculum content.	
A&S 4	**Budget Levels**	Budget for hardware and software purchases and professional development.	Budget for hardware and software purchases (new and replacement) and professional development, minimal staffing support, and some ongoing costs.	Budget for purchases, professional development, adequate staffing support, and ongoing costs. Other state, federal, and local programs directed to support technology funding. Business partnerships, donations, and other local funding designated for technology.	Budget for purchases, incentives for professional development, sufficient staffing support, and ongoing costs. Appropriate budget to support district technology plan.	
A&S 5	**Budget Allocated for Technology (Total Cost of Ownership)**	Less than $175 per student.	Between $175- $300 per student.	Between $300 - $425 per student	$425 or more per student	

Focus Areas / Levels of Progress		Early Tech	Developing Tech	Proficient Tech	Advanced Tech	Our District Levels
		1	2	3	4	
IN 1	**Universal Design and Accessible Technology Considerations (e.g. Section 508)**	Considerations for universal design and accessible technologies are limited to the Individual Education Program (IEP) process for students with disabilities. Procurement policies for information and instructional technologies do not ensure usability, equivalent access, or interoperability.	Considerations for universal design and accessible technologies are established in areas of high student use (e.g., libraries, computer labs); inconsistent implementation of procurement policies for information and instructional technologies that ensure usability, equivalent access, and interoperability.	Considerations for universal design and accessible technologies are established in areas of high student use (e.g., libraries, computer labs), some classrooms and administrative offices; routine implementation of procurement policies for information and instructional technologies that ensure usability, equivalent access, and interoperability.	Universal design and accessible technologies considerations are established throughout the district; procurement policies for information and instructional technologies that ensure usability, equivalent access, and interoperability in accordance to the guidelines established by Section 508.	
IN 2	**Students Per Instructional Computer**	10 or more students per modern computer; no firm computer replacement policy established by district. [Modern is defined by the most recent NH annual tech survey computer levels.]	Less than 10 students per modern computer; replacement policy established; one computer per teacher.	Less than 5 students per modern computer; replacement cycle established for 6 years or less; one computer per teacher - possibly a laptop for homework. Most students have access to handheld electronics (e.g., PDA's, graphing calculators, Alpha Smarts). Maintains a list of places students can use technology outside of school.	One student per modern computer or other electronic device. Replacement cycle established for 5-6 years or less; one computer per teacher - possibly a laptop for homework. 75% of computers meet modern standards. School works with community to provide equitable access to technology for students and community members after school hours.	
IN 3	**Internet Access Connectivity/Speed**	Dial-up connectivity to the Internet available only on a few computers. District wide acceptable use policy in place.	Direct connectivity to the Internet available at each school and in most rooms. Adequate bandwidth to the school to avoid most delays.	Direct connectivity to the Internet available in all rooms in all schools. Adequate bandwidth to each classroom over the LAN (10/100mb) to avoid most delays. Easy access for students and teachers including some wireless.	Direct connectivity to the Internet available in all rooms in all schools. Adequate bandwidth to each classroom over the LAN (10/100mb). Easy access for students and teachers including most wireless connectivity to enable interactive presentations and video.	
IN 4	**E-Learning Environments**	Limited web- and/or satellite-based interactive learning opportunities delivered synchronously, or asynchronously, on a scheduled or unscheduled basis, primarily for professional development and limited exploration of web 2.0 technologies.	Expanded interactive learning opportunities with the possible addition of asynchronous video streaming or synchronous videoconferencing; addition of courses for teachers and student courses at the high school and college level (K-16); some use of web 2.0 technologies.	Improved access to web-based and/or interactive IP-based video learning on the local, state, regional, national, and international level; applications include courses, cultural projects, virtual field trips, etc.; expanded use of web 2.0 technologies by both teachers and students.	Seamless IP-based infrastructure expanded to K-16 to allow development of high-quality web- and video-based content. Content distribution available for all students and teachers. Archives allow for content review asynchronously and sharing/distribution of these resources. Extensive use of web 2.0 technologies.	

Focus Areas / Levels of Progress		Early Tech	Developing Tech	Proficient Tech	Advanced Tech	Our District Levels
		1	2	3	4	
IN 5	**LAN/WAN**	Limited print/file sharing network at each school for lab, administration, and some classrooms. Some shared resources and providing some secure storage space.	Most rooms connected to Internet via LAN/WAN and wireless connectivity where possible at each school with student access. Minimum 10/100 mb Cat 5 hubbed network. Basic servers for sharing some resources at each school.	All rooms connected to Internet via LAN/WAN with significant wireless connectivity at each school with sufficient bandwidth for effective student access. Minimum 10/100 mb Cat 5 switched network. Servers for providing secure storage, backups, schedule, e-mail, web. Students, teachers and parents have easy access to educational resources from home and school (e.g., web portal).	All rooms connected to Internet via LAN/WAN with significant wireless connectivity at each school with sufficient bandwidth for effective student access. All schools connected to the WAN (100 mb/gb switched network) have sufficient servers and bandwidth for content delivery through resources such as video streaming and conferencing. Students, teachers and parents have easy access to educational resources from home and school (e.g., web portal).	
IN 6	**Other Technologies**	Shared teacher use of resources such as telephone, TVs, VCRs, DVDs, and classroom sets of programmable calculators.	Shared use of resources such as telephone, TVs, VCRs, DVDs, classroom sets of programmable calculators, digital cameras, and scanners. Computer/Video projectors available.	Dedicated and assigned use of common technologies such as telephone, TVs and VCRs and DVDs. Programmable calculators assigned to each student as needed. In each school there is shared use of specialized technologies, digital cameras, scanners, handheld electronic devices, and computer/video projectors.	Fully equipped classrooms with computer/video projectors and technology that will enhance student instruction readily available as above as well as using new and emerging technologies (i.e., interactive whiteboards, student response systems, netbooks, etc.)	
IN 7	**Security**	Backup and restoration procedures and virus protection to guard individual computers.	Basic firewall protection and diligent upgrading of network vulnerabilities added to protect against external threats.	Adequate server and availability protection added to above for expanded capabilities and to ensure dependable access.	Usage authentication added to above for mobile computer and home/external access requirements.	

ARRA Educator Survey[40]

Hezel Associates, a research company located in Syracuse, NY is working with the New Hampshire Department of Education to conduct an external, state-wide evaluation of the ARRA/Title II-D grant program. As part of the evaluation, we would like to ask you some questions about your experiences and views regarding the use of technology in the classroom (or other educational setting). Your individual responses are confidential and will not be shared with anyone outside of Hezel Associates. We will be summarizing your responses to appear in reports to your project manager and the New Hampshire Department of Education, however this information will be reported in aggregate, and no identifying information (such as your name) will be included. We only ask for your name on this survey so that we can track who has responded, as well as match up your responses from subsequent surveys you complete. This survey should take approximately 15 minutes to complete. Thank you for providing this baseline data, and making this evaluation a success.

Note: In order for your response to be included in the analysis, you will need to complete the consent form found at http://www.hezel.com/cgi-bin/rws5.pl?FORM=NHConsentForm

If you have any questions about this survey or the evaluation, please contact Naomi Smoke-Zur at naomi@hezel.com.

Teacher Profile

Your Name (for Hezel Associates' internal use only): _____

1. Type of NH Title II-D project(s) in which you are participating (check all that apply)[41]:
   - ARRA/Title II-D
   - Classroom Technology Mini-grant
   - Tech Leader Cohort (TLC) Program
   - Digital Tools Grant
   - Digital Resources Consortium
   - Not applicable
   - I don't know

2. School Name (all schools appearing in the list are organized alphabetically by district):
   - Districts A-G
   - Districts H-M
   - Districts N-Z

3. Your title/role (check all that apply):

_____

[40] Wording was updated to past tense for Spring 2011 survey.
[41] Option choices "Digital Tools Grant," "Digital Resources Consortium" only appeared on Spring 2011 survey; updated to match Case Study Report Form.

- Classroom teacher
- Special Education teacher
- Title I teacher
- Paraprofessional/Aide
- ELL specialist
- Technology Integrator
- School librarian
- Department chair
- Other: _____

4. Grade level(s) you taught during the 2010-11 school year (check all that apply):
- Kindergarten
- Grade 1
- Grade 2
- Grade 3
- Grade 4
- Grade 5
- Grade 6
- Grade 7
- Grade 8
- Grade 9
- Grade 10
- Grade 11
- Grade 12

5. As of today, how many years have you been teaching?

6. Subject area(s) you taught during the 2010-11 school year (check all that apply):
- English/Language Arts
- Science
- Math
- Social Studies
- Art
- Music
- Physical Education
- Computer Technology
- World Languages
- Other (please specify): _____

Teacher Profile

7. What role is your classroom playing in Title II-D grant activities, if applicable for your grant?
- Participant/experimental group
- Comparison/control group

- Not applicable - No separate groups in our grant
- I don't know

8. Did you receive the technology that the ARRA/Title II-D grant funded?
- Yes, all of it
- Yes, some of it
- No

8a. If Yes, when did you begin implementing the technology?[42]
- [month drop-down] and [year drop-down]

9. Please indicate your level of access to the technology during the ARRA grant period.[43]
- I had access to the technology for the entire ARRA grant as the technology stayed in my classroom.
- I had access to the technology for a portion of the ARRA grant as the technology rotated between classrooms.

    9a. If the technology rotated between classrooms, please indicate the month and year that corresponds to when you had access to the technology.
        Month/year when you obtained access to the technology (2 drop-downs)
        Month/year when you no longer had access to the technology (2 drop-downs)
        Comments: [open-ended]

10. Did you use ARRA grant funds to implement a 1 to 1 intervention with your students?
- No
- Yes - it was a 1 to 1 intervention with students having access to the technology 24/7 (technology can leave the school)
- Yes - it was a 1 to 1 intervention with students having access to the technology during the school day (technology remains at the school)
- I don't know

11. What technology hardware did your district/school purchase with ARRA funds for you to use in your classroom?[44]
- Digital data / LCD projectors
- Video conferencing units
- Large monitors (i.e., 32" or larger)
- Interactive White Boards
- Student response systems (i.e., clickers)

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[42] Wording changed for Spring 2011 survey. Spring 2010 and Fall 2010 survey stated: If Yes, have you begun implementing any of the technology received from your ARRA/Title II-D grant funds *with your students?*"
[43] Questions 9 and 9a were added to Spring 2011 survey and did not appear on prior versions; subsequent question numbers were updated for Spring 2011 survey.
[44] Option choices "Desktop computers," "Laptop computers," and "Netbooks" only appeared on Fall 2010 and Spring 2011 surveys.

- Digital cameras (still images)
- Digital Video recorders (e.g., Flip)
- Image scanners
- Portable digital audio players (e.g., MP3)
- PDA Handhelds (e.g., Palm)
- Mobile multi-purpose tools (i.e., iPod Touch, iPhone, Nintendo DS)
- Portable keyboards (e.g., AlphaSmarts but not laptop computers)
- Global Positioning System (GPS Units)
- Robotics kits (e.g., Lego, Vex)
- Digital microscopes
- Graphing calculators
- Calculator Based Labs (CBLs) for use with graphing calculators
- Data collection tools (e.g., sensors and probes)
- Data collection interfaces/loggers (e.g., Vernier LabPros, Hobo Loggers)
- Desktop computers
- Laptop computers
- Netbooks
- Other _____

12. Of the 180 school days (this year), how many of those days did your students use the new technology for learning purposes? _____

13. On the days that students used the new technology, approximately what percentage of class time did your students use the technology?_____

Domain 1: Planning and Preparation

For the questions that follow, please use the columns provided to mark your responses.

14. I design instruction that requires the use of these technologies by the **teacher.**
Answer choices: Yes, No

- Desktop computers
- Laptop computers
- Netbooks
- Digital presentation tools (e.g., projector, document camera)
- Interactive whiteboard
- Digital media tools (e.g., cameras, recorders)
- Digital handheld tools
- Assistive technology

15. I design learning experiences that require the use of these technologies by the **students**.
Answer choices: Yes, No

- Desktop computers
- Laptop computers

- Netbooks
- Digital presentation tools (e.g., projector, document camera)
- Interactive whiteboard
- Digital media tools (e.g., cameras, recorders)
- Digital handheld tools
- Assistive technology

16. Please indicate whether you agree or disagree with the following statements.
Scale: Strongly agree, agree, disagree, and strongly disagree

a. Computer labs are available when I need them to use with my students.
b. The technology at my school is functioning properly.
c. I am able to design lessons using digital tools that meet instructional objectives
d. I have adapted lessons in order to include digital tools.
e. I am able to use digital tools to personalize learning activities to meet individual student needs.
f. Planning lessons that use technology is more time consuming than planning lessons that do not use technology.

Domain 2: The Classroom Environment

17. Please indicate whether you agree or disagree with the following statements.
Scale: Strongly agree, agree, disagree, and strongly disagree

a. Students are motivated to complete tasks when using technology
b. Students are on-task when using technology
c. Students are engaged when using technology
d. Classroom management is difficult when students are using technology
e. I receive enough technical support to be successful in using technology with students
f. I model safe and ethical use of technology tools (ex. Protecting personal information, citing sources, following copyright laws) for my students.

Domain 3: Instruction

18. On average, how often did you use technology in your instruction with students?
Scale: daily, 2-4 times per week, once per week, 1-2 times per month, 3-5 times per year, Never

19. On average, how often did your *students* use technology for learning purposes during your classtime?
Scale: daily, 2-4 times per week, once per week, 1-2 times per month, 3-5 times per year, Never

20. What computer applications did you use in your instruction with students?
- Administrative (e.g., grading, record-keeping)
- Assessment/Testing
- Assistive (e.g., screen reader)

- Computer-Assisted Instruction/ Integrated Learning System e.g. PLATO, Odysseyware, Waterford Reading
- Thinking tools (e.g., visual organizer, simulation, modeling, problem-solving)
- Hardware-embedded (e.g. whiteboard, PGS/GIS, digital interactive response system)
- Multimedia (e.g., digital video editing)
- Productivity software (e.g., database, presentation, spreadsheet, word processing)
- Programming or web scripting (e.g., Javascript, PHP, Visual Basic)
- Graphics/Publishing (e.g., page layout, drawing/painting, CAD, photo editing, web publishing)
- Subject-specific software
- Web Browser (e.g.,
- Web Applications: Course management software (Moodle, Sakai, etc.)
- Web Applications: Database systems
- Web Applications: Libraries, E-publications
- Web Applications: Search engine
- Web Applications: Collaboration tools (e.g., Google Apps)
- Web Applications: Synchronous communication tools (e.g., Video, voice, or real-time text conference)
- Web Applications: Asynchronous communication tools (e.g., blogs, Wiki, discussion board, email)
- Other _____

Domain 3: Instruction

21. For what *activities* did your *students* use technology?
    - Listening
    - Completing worksheet
    - Notetaking
    - Answering questions
    - Discussions
    - Presentations
    - Writing/Creating
    - Completing hands-on activity
    - Imaging
    - Assessment
    - Downtime
    - Other _____

22. For what *purposes* did your *students* use technology?
    - Practicing skills
    - Defining concepts
    - Reviewing
    - Researching
    - Explaining ideas

- Applying concepts
- Comparing and contrasting
- Reflection
- Collaborating
- Constructing knowledge
- Organizing information
- Solving authentic problems
- Exploring real-world issues
- Other _____

23. Which student groupings were present when you were using the technology?
- Whole class
- Small groups
- Partners
- Independent

24. Please indicate whether you agree or disagree with the following statements.
Scale: Strongly agree, agree, disagree, and strongly disagree.

a. I teach safe and ethical uses (ex. Protecting personal information, citing sources, following copyright laws) of technology tools for my students.
b. I have received enough curriculum support to successfully integrate technology into my teaching.
c. I feel comfortable using technology with my classroom.
d. I am proficient at using technology in instruction.
e. I believe using technology in instruction improves learning.
f. Using technology increase my instructional effectiveness.

Domain 4: Professional Responsibilities

25. Please indicate whether you agree or disagree with the following statements.
Scale: Strongly agree, agree, disagree, and strongly disagree.

a. My school administrators are interested in my using technology effectively with students.
b. My district administrators are interested in my using technology effectively with students.
c. I assist my colleagues to develop their technology skills.

26. Please indicate how often you did the following:
Scale: Daily, 2-4 times per week, Once per week, 1-2 times per month, 3-5 times per year, Never

a. I share my ideas for using technology to enhance learning with my colleagues
b. I participate in online learning communities for professional development

27. What aspects of training did you feel were missing from trainings? (Check all that apply)

- Nothing was missing

- Need more hand outs or reference material
- Needs to be longer
- Need more hands-on time to practice during the training
- Need more time for dialogue (with the instruction or colleagues)
- Need to understand how to integrate it into my curriculum
- Need to be able to take the equipment home with me
- Other (please describe): _____

Domain 5: Concluding Thoughts[45]

28. Please provide one example where you successfully integrated technology into your curriculum and instruction with students. What impact was observed (if any) on student learning and/or engagement. [open-ended]

29. Are there any "lessons learned" that would be helpful to share with other schools and/or districts implementing similar technology initiatives? [open-ended]

30. Does your school/district have a sustainability plan to allow for continued implementation of instructional technology and training once the ARRA grant period has ended?

- Yes (please describe the plan): _____
- No
- I don't know

*Thank you for participating in this survey. When you have finished, please click "**Submit**" below to record your response.*

[45] Questions 28-30 only appeared on Spring 2011 survey.

TLC and Mini-Grant Educator Survey

Hezel Associates, a research company located in Syracuse, NY is working with the New Hampshire Department of Education to conduct an external, state-wide evaluation of the Title II D grant program. As part of the evaluation, we would like to ask you some questions about your experiences and views regarding the use of technology in the classroom (or other educational setting). Your individual responses are confidential and will not be shared with anyone outside of Hezel Associates. We will be summarizing your responses to appear in reports to the New Hampshire Department of Education, however this information will be reported in aggregate, and no identifying information (such as your name) will be included. We only ask for your name on this survey so that we can track who has responded. This survey should take approximately 15 minutes to complete. Thank you for providing this data, and making this evaluation a success.

Note: In order for your response to be included in the analysis, you will need to complete the consent form found at http://www.hezel.com/cgi-bin/rws5.pl?FORM=TLC_Minigrant_ConsentForm.

If you have any questions about this survey or the evaluation, please contact Naomi Smoke-Zur at naomi@hezel.com.

Teacher Profile

Your Name (for Hezel Associates' internal use only): _____

1. Type of NH Title II-D project(s) in which you are participating (check all that apply):
   - Mini-grant
   - TLC (Technology Leader Cohort)
   - NML (New Media Literacies)
   - ARRA/Title II-D
   - Not applicable
   - I don't know

2. School Name (all schools appearing in the list are organized alphabetically by district):
   - Districts A-G
   - Districts H-M
   - Districts N-Z

3. Your title/role (check all that apply):
   - Classroom teacher
   - Special Education teacher
   - Title I teacher
   - Paraprofessional/Aide
   - ELL specialist
   - Technology Integrator

- School librarian
- Department chair
- Other: _____

4. Grade level(s) you taught during the 2010-11 school year (check all that apply):
- Kindergarten
- Grade 1
- Grade 2
- Grade 3
- Grade 4
- Grade 5
- Grade 6
- Grade 7
- Grade 8
- Grade 9
- Grade 10
- Grade 11
- Grade 12

5. As of today, how many years have you been teaching? _____

6. Subject area(s) you taught during the 2000-10 school year (check all that apply):
- English/Language Arts
- Science
- Math
- Social Studies
- Art
- Music
- Physical Education
- Computer Technology
- World Languages
- Other (please specify): _____

Domain 1: Planning and Preparation

For the questions that follow, we ask you to reflect upon two different periods of time, the time period prior to implementation of your TLC or Mini-grant project ("Before project began") and after the project concluded ("After project ended"). Please use the columns provided to mark your responses.

*7. I design instruction that requires the use of these technologies by the **teacher.**[46]
Answer choices: Yes, No

- Desktop computers
- Laptop computers
- Netbooks
- Digital presentation tools (e.g., projector, document camera)
- Interactive whiteboard
- Digital media tools (e.g., cameras, recorders)
- Digital handheld tools
- Assistive technology

*8. I design learning experiences that require the use of these technologies by the **students**.
Answer choices: Yes, No

- Desktop computers
- Laptop computers
- Netbooks
- Digital presentation tools (e.g., projector, document camera)
- Interactive whiteboard
- Digital media tools (e.g., cameras, recorders)
- Digital handheld tools
- Assistive technology

*9. Please indicate whether you agree or disagree with the following statements.
Scale: Strongly agree, agree, disagree, and strongly disagree

g. Computer labs are available when I need them to use with my students.
h. The technology at my school is functioning properly.
i. I am able to design lessons using digital tools that meet instructional objectives
j. I have adapted lessons in order to include digital tools.
k. I am able to use digital tools to personalize learning activities to meet individual student needs.
l. Planning lessons that use technology is more time consuming than planning lessons that do not use technology.

Domain 2: The Classroom Environment

*10. Please indicate whether you agree or disagree with the following statements.
Scale: Strongly agree, agree, disagree, and strongly disagree

g. Students are motivated to complete tasks when using technology
h. Students are on-task when using technology

[46] All questions marked with an asterisk (*) asked participants to reflect upon two different periods of time: before project began and after project ended

i. Students are engaged when using technology
j. Classroom management is difficult when students are using technology
k. I receive enough technical support to be successful in using technology with students
l. I model safe and ethical use of technology tools (ex. Protecting personal information, citing sources, following copyright laws) for my students.

Domain 3: Instruction

*11. On average, how often did/do you use technology in your instruction with students?
Scale: daily, 2-4 times per week, once per week, 1-2 times per month, 3-5 times per year, Never

*12. On average, how often did/do your *students* use technology for learning purposes during your classtime?
Scale: daily, 2-4 times per week, once per week, 1-2 times per month, 3-5 times per year, Never

*13. What computer applications did/do you use in your instruction with students?

- Administrative (e.g., grading, record-keeping)
- Assessment/Testing
- Assistive (e.g., screen reader)
- Computer-Assisted Instruction/ Integrated Learning System e.g. PLATO, Odysseyware, Waterford Reading
- Thinking tools (e.g., visual organizer, simulation, modeling, problem-solving)
- Hardware-embedded (e.g. whiteboard, PGS/GIS, digital interactive response system)
- Multimedia (e.g., digital video editing)
- Productivity software (e.g., database, presentation, spreadsheet, word processing)
- Programming or web scripting (e.g., Javascript, PHP, Visual Basic)
- Graphics/Publishing (e.g., page layout, drawing/painting, CAD, photo editing, web publishing)
- Subject-specific software
- Web Browser (e.g.,
- Web Applications: Course management software (Moodle, Sakai, etc.)
- Web Applications: Database systems
- Web Applications: Libraries, E-publications
- Web Applications: Search engine
- Web Applications: Collaboration tools (e.g., Google Apps)
- Web Applications: Synchronous communication tools (e.g., Video, voice, or real-time text conference)
- Web Applications: Asynchronous communication tools (e.g., blogs, Wiki, discussion board, email)
- Other _____

Domain 3: Instruction

*14. For what *activities* did/do your *students* use technology?

- Listening

- Completing worksheet
- Notetaking
- Answering questions
- Discussions
- Presentations
- Writing/Creating
- Completing hands-on activity
- Imaging
- Assessment
- Downtime
- Other _____

*15. For what *purposes* did/do your *students* use technology?

- Practicing skills
- Defining concepts
- Reviewing
- Researching
- Explaining ideas
- Applying concepts
- Comparing and contrasting
- Reflection
- Collaborating
- Constructing knowledge
- Organizing information
- Solving authentic problems
- Exploring real-world issues
- Other _____

*16. Which student groupings were present when you were using the technology?

- Whole class
- Small groups
- Partners
- Independent

*17. Please indicate whether you agree or disagree with the following statements.
Scale: Strongly agree, agree, disagree, and strongly disagree.

g. I teach safe and ethical uses (ex. Protecting personal information, citing sources, following copyright laws) of technology tools for my students.
h. I have received enough curriculum support to successfully integrate technology into my teaching.
i. I feel comfortable using technology with my classroom.
j. I am proficient at using technology in instruction.
k. I believe using technology in instruction improves learning.
l. Using technology increase my instructional effectiveness.

Domain 4: Professional Responsibilities

*18. Please indicate whether you agree or disagree with the following statements.
Scale: Strongly agree, agree, disagree, and strongly disagree.

a. My school administrators are interested in my using technology effectively with students.
b. My district administrators are interested in my using technology effectively with students.
c. I assist my colleagues to develop their technology skills.

*19. Please indicate how often you do the following:
Scale: Daily, 2-4 times per week, Once per week, 1-2 times per month, 3-5 times per year, Never

a. I share my ideas for using technology to enhance learning with my colleagues
b. I participate in online learning communities for professional development

20. What aspects of training do you feel are missing from current trainings? (Check all that apply)

- Nothing is missing
- Need more hand outs or reference material
- The training needs to be longer
- Need more hands-on time to practice during the training
- Need more time for dialogue (with the instruction or colleagues)
- Need to understand how to integrate it into my curriculum
- Need to be able to take the equipment home with me
- Other (please describe): _____

*Thank you for participating in this survey. When you have finished, please click "**Submit**" below to record your response.*

NH District Technology Survey

This survey is available in MS-Word format for download at www.nheon.org/oet/survey

Questions?
For inquiries relating to specific survey questions or their content, please contact Cathy Higgins at chiggins@ed.state.nh.us.

For inquiries relating to survey technical support, please contact Naomi Smoke-Zur at naomi@hezel.com.

IMPORTANT NOTES ABOUT THIS SURVEY

Designed as a comprehensive assessment of the overall technology environment within NH schools, this survey data can assist technology decision makers at both the local and state level. There is a companion survey for each school in the district with DIFFERENT questions. (*Note: If your district is composed of a single school, you should complete both the district and the school surveys because the* ***questions are different.****)*

The New Hampshire Department of Education (NHDOE) relies on this survey data to evaluate the extent to which the state and its schools are effectively implementing technology plans and programs. Survey data also helps verify compliance with federal and state technology requirements. **Districts receiving Title II-D grants are REQUIRED to complete this survey as part of their grant evaluation reporting**.

For your convenience in gathering data for this survey, it is available in MS-Word format. We strongly encourage you to download the Word version and save your responses in Word format for future reference. Go to NHEON.org/oet/survey to access both the Word and the online versions of this district survey, as well as the school tech survey.

Please be sure to consult with other staff in your school to provide the most informed answers possible.

DATA COLLECTION: We strongly suggest that you gather your data using the Word Version of the survey and then go back and enter your responses in the survey system.

MAKING CHANGES: You will not be able to make any changes to your survey once it has been submitted.

NUMERIC RESPONSES: For all questions that require numeric responses, you may only include decimal points. Please do not input any other characters or symbols ($,%).

This SURVEY will CLOSE on March 11, 2011.

General

1. District Name: _____

2. Contact (person completing this survey): _____

3. Your position:
- Principal, Assistant Principal, Other Administrator
- Tech Director/Coordinator
- Ed Tech Integrator
- Library Media Specialist/Director
- Classroom Teacher
- Other

4. Your email address:_____

5. District website address: _____

6. Number of schools in your district:_____

Technology Access: Hardware
All hardware questions are included in the school building survey (separately). This includes numbers and levels of computers and their locations, mobile labs, and other digital tools.

Technology Access: Software

7. Which Internet filtering mechanism(s) do you use in your district?
- None. Our district decided not to use filtering software.
- Dan's Guardian (open source)
- iPrism (St Bernard)
- Microsoft Proxy
- Sonic Wall
- WebSense
- Other (please specify):_____

8. How many days do you retain your Internet **filtering log files**?
- None because we do not filter.
- 0-7 days
- 8-30 days
- 31-90 days
- 91-365 days
- More than 365 days

9. How much time (in hours) is spent each month on filter maintenance and block/unblock requests?

- Less than 5 hrs
- 5-8 hrs
- 9-16 hrs
- 17-24 hrs
- 25-32 hrs
- 33 or more hours

10. What is the name of the firewall solution being used in your district? _____

11. Which **library automation system(s)** do you use in your district?
- None
- Follett
- Sagebrush Spectrum (Winnebago)
- Horizon
- Koha Automated Libraries
- Other (please specify):_____

12. Please indicate which, if any, **curriculum-mapping** software is used by any school in your district.
- None
- TechPaths
- CurriculumMapper
- Locally developed using Access, Filemaker Pro, etc.
- Other (please specify):_____

Technology Access: Connectivity and Networks

Teacher/Staff Access

13. Is there a **district** policy or expectation for teachers to use their school/district email address as a primary school communication tool?
- Yes, this is a policy.
- There is an expectation but not a policy about this.
- No, we have neither.

Connectivity

14. What is the name of your districts' **Internet Service Provider** (check all that apply)
- Adelphia
- Comcast
- Destek
- G4 Communications
- Lightship/CTC/One Communications
- Metrocast

- NCIA
- NHVT.net
- Paetec
- TDS Telecom
- TimeWarner
- Worldpath
- Other (please specify):_____

15. If you are a multi-school district, how do you receive notification of an Internet outage at one of your schools?[47]

- Electronic notification system
- Vendor
- School staff/users
- Other, please specify:_____

16. What is the total committed, currently purchased **bandwidth** to your district?[48]

- No connection
- Dial-up or 56K access
- ISDN, DSL, broadband/cable, or fractional T1
- Full T1, ATM, or greater

17. What is the current LAN, WAN, and WLAN age and speed for the majority of schools in your district? (NOTE: If any school in your district has a slower connection, please add a comment in the last question of this survey.)[49]

	10 Mbps	100 Mbps	1000 Mbps
LAN	O	O	O
WAN	O	O	O
WLAN (if applicable)	O	O	O

18. What is the current age (in years) of the following elements of your network?[50]
LAN:_____
WAN:_____
WLAN[51]:_____

19. Has your district budgeted for the replacement and/or upgrade cycles for the following?

	Upgrade Budgeted in 2010-11		**Upgrade Budgeted for 2011-12?**	
	Yes	*No*	*Yes*	*No*
• LAN	O	O	O	O

[47] Appeared as question 18 in S10 survey.
[48] Appeared as question 15 in S10 survey.
[49] Appeared as question 16 in S10 survey.
[50] Appeared as question 17 in S10 survey.
[51] Appeared as "Internet" in S10 survey.

• WAN	O	O	O	O
• WLAN[52]	O	O	O	O

20. Does your district plan to have Voice over IP (VOIP) within the next 1-2 years?
- Yes
- No
- Already have

21. What is your current email solution?

	Hosted in District?		**Managed Service Used?**	
	Yes	*No*	*Yes*	*No*
First Class	O	O	O	O
Gaggle	O	O	O	O
Google Gmail	O	O	O	O
Novell Groupwise	O	O	O	O
MS Outlook	O	O	O	O
Other	O	O	O	O

If other, please specify:_____

22. How much time (in hours) is spent each month on email maintenance?
- Less than 5 hrs
- 5-8 hrs
- 9-16 hrs
- 17-24 hrs
- 25-32 hrs
- 33 or more hours

Technology Access: Service and Support

Since the following questions cover the range of large and small districts, please email chiggins@ed.state.nh.us if you need clarification before completing the questions in this section.

23. How many **full time district IT** staff members do you have?
(NOTE: If you have 2 half time staff, count them as 1 full time staff member.)
- 1 part time person for district
- 1 full time person for district
- 2 full time staff for district
- 3 full time staff for district
- 4 full time staff for district
- 5 or more full time staff for district

[52] Appeared as "Internet" in S10 survey.

24. If you have only one or two IT staff, are the majority of support services in the district (i.e., hardware, applications, and curriculum integration) provided by the **same person(s)?**

- Yes
- No

25. If you have only one technology staff position for the district and that person is serving the district in other capacities, what are those other positions?

- Administrative Assistant
- Assistant Principal
- Computer or Tech Ed Teacher
- Curriculum Director
- Library Media Specialist or Assistant
- Principal
- Educational Technology Integrator
- Career and Technical Education Director
- Other (please specify):_____

26. By district, what is the count of school personnel (by staff category) who met technology standards (i.e. are proficient at a moderate level in technology according to the NETS-T standards) for the 2010-11 school year? Only include full-time, school-based staff in your response.[53]

Staff Category	A. Number of personnel who met technology standards	B. Number of personnel who *DID NOT* meet technology standards	C. Total number of personnel (this value should represent the sum of columns A and B)
All Teachers	_____	_____	_____
Librarians/Media Specialists	_____	_____	_____
School Administrators	_____	_____	_____

*Please help us understand your district tech support model for **hardware maintenance**.*

27. How does your district handle hardware maintenance support? (Check all that apply)

- We pay an IT company or individual (**either full year or a number of days/hours**) for tech support.
- We have a **full time district level** technology director/coordinator providing hardware maintenance as part of his/her duties.
- Our district tech coordinator and/or staff **serve multiple school buildings** for hardware maintenance.

*Please help us understand your district tech support model for **applications software**.*

[53] Question added to S11 survey. As a result, all question numbers were updated for S11 survey (i.e., questions 27-37 appeared as questions 26-36 on S10 survey).

28. How does your district handle **applications software** support? (Check all that apply)

- We pay an IT company or individual **(either full year or a number of days/hours)** for applications support.
- We have a **full time district level** technology staff position providing applications software support as part of his/her duties.
- Our district tech coordinator and/or staff **serve multiple school buildings** for applications software.

*Please help us understand your district professional development support model for **21st century learning powered with technology** (i.e., curriculum integration).*

29. How does your district handle support for **21st century learning powered with technology**? (Check all that apply)

- We pay/sponsor a Local Educational Support Center (**full year subscription, number of days, or number of integration sessions**) to provide our teachers with 21st century learning support.
- We pay an IT company or individual (**either full year or a number of days/hours**) to provide 21st century learning support.
- We have a **full time district level** technology staff position providing 21st century learning support as part of his/her duties.
- Our district tech coordinator and/or staff **serve multiple school buildings** for 21st century learning support.

Technology Access: Budget

The following questions are intended to provide a general picture of the extent to which technology is funded at the local level. Please provide your best estimates based on available budget figures.

NOTE 1: Count only local dollars. Do not include federal grant funds, eRate, or other grants.

NOTE 2: Please include SAU expenses where appropriate, but take care not to double count amounts if yours is a multi-district SAU.

NOTE 3: Be sure to include tech support staff dollars in your calculations. These would be any staff providing support referenced in your answers to questions 26 - 28 above

30. During 2009-10, what was the approximate total amount of **local funds** spend for the hardware, software, connectivity, and tech support staff provided in your district?[54]

[54] Appeared as "2008-09" in S10 survey.

31. For the current year 2010-11,[55] what is the district's **locally** budgeted amount for hardware, software, connectivity, and tech support staff?

_____

32. For the upcoming 2011-12 year,[56] what is the districts projected **locally** budgeted amount for hardware, software, connectivity, and tech support staff?

_____

33. Has there been any discussion between the district and the town offices regarding cooperation on a not-for-retail intranet, allowing town and school officials to be in communication with one another?

- Yes
- No
- If yes, briefly summarize the status of these discussions:_____
  _____

Technology Access: E-Rate

The following questions refer to E-Rate applications submitted last year for funding in 2010-11.[57]

34. Did your district **apply for** 2010-11 **plain old telephone services (POTS) discounts** through the federal E-Rate program?[58]

- Yes
- No

35. Did your district apply for the following discounts through the federal E-Rate program for the 2010-11 or 2011-12 academic year?[59]

Response options include*: Yes, via direct reimbursement (BEAR Form 472)—Yes, via discounted bills from provider (SPIF Form 474)—No, we did not receive this discount.*

- Priority 1 discounts on Internet access (2010-11 academic year)
- Priority 2 discounts on internal networking (2010-11 academic year)
- Priority 1 discounts on Internet access (2011-12 academic year)
- Priority 2 discounts on internal networking (2011-12 academic year)

36. If your district did not apply to receive discounts through the federal E-Rate program for the current funding year 2010-11, what were the main reasons?[60]

_____

[55] Appeared as "2009-10" in S10 survey.
[56] Appeared as "2010-11" in S10 survey.
[57] Appeared as "2009-10" in S10 survey.
[58] Appeared as "2009-10" in S10 survey.
[59] "2010-11 or 2011-12" appeared as "2009-10 or 2010-11" on S10 survey.

- We were unaware of the program.
- We were aware of the program but did not have sufficiently trained staff to dedicate to completing the application process.
- We were aware of the program and chose not to apply for programmatic reasons, such as our school and district discount levels or other reason.
- We were aware of the program but are not eligible due to multi-year contracts signed outside of E-Rate program filing schedules (i.e., never filed Form 470 or signed contract before Form 471 filing window opened).

37. Please tell us any additional information about school technology, which you believe, is important for the NH Department of Education to know:_____

*Thank you for participating in this survey. When you have finished, please click "**Submit**" below to record your responses.*

[60] "2010-11" appeared as "2009-10" on S10 survey.

NH School Technology Access Survey

This survey is available in MS-Word format for download at www.nheon.org/oet/survey

Questions?
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The New Hampshire Department of Education (NHDOE) relies on this survey data to evaluate the extent to which the state and its schools are effectively implementing technology plans and programs. Survey data also helps verify compliance with federal and state technology requirements. **Districts receiving Title II-D grants are REQUIRED to complete this survey as part of their grant evaluation reporting.**

The school survey is divided into TWO parts:
(1) Technology Access (hardware, connectivity to online resources, service & support)
(2) ICT Literacy and Professional Development

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NUMERIC RESPONSES: For all questions that require numeric responses, you may only include decimal points. Please do not input any other characters or symbols ($,%).

This SURVEY will CLOSE on March 11, 2011.

General

1. School Name (all schools appearing in the list are organized alphabetically by district):
   - Districts A-G
   - Districts H-M
   - Districts N-Z

2. Contact (person completing this survey):_____

3. Your position:
   - Principal, Assistant Principal, Other Administrator
   - Tech Director/ Coordinator
   - Ed Tech Integrator / Tech Integration Specialist
   - School Library Media Specialist
   - Classroom Teacher
   - Other:

4. Your email address:_____

Technology Access: Hardware

Computers All Levels - PLEASE NOTE UPDATED LEVEL DEFINITIONS THIS YEAR

Please indicate below the number of multimedia computers of each type in use in your school building for INSTRUCTIONAL purposes. Computers that are older than Level A should be indicated as "level 0" per question #5. Count the number of school computers located in labs, media centers, classrooms, special education, vocational centers, and on mobile lab carts available for student use.

Please note that while the Mac levels will be easy to identify, the PC levels may require some approximation on your part, since actual processor speeds can vary according to PC brand and features.

DO NOT include computers used largely for ADMINISTRATIVE purposes.

5. **Level 0** - How many computers (Mac or PC) are still used but too old to count according to Level A,B,C descriptions? (Note: **do not** include these numbers in any other questions.)_____

6. How may **Apple Mac** computers do you have for instruction at each level?
Level A –Mac G4:_____
Level B –Mac G5:_____
Level C –Mac Intel:_____
Total Macs:_____

7. How many **PC** computers do you have for instruction at each level (including desktops and regular laptops but not netbooks)?
Level A –1 GHz or less processor speed:_____
Level B –Better than 1 GHz up to 2GHz processor speed:_____
Level C –Better than 2 GHz processor speed:_____
Total PCs:_____

8. How many **Thin Client** computers (running Citrix Windows, Linux, or some similar configuration to create thin clients) do you have for instruction?_____

9. How many **Netbook** computers do you have for instruction? (do not include regular laptops here) _____

Total (Thin Client + Netbook):_____

10. Please identity the **approximate percentage** of computers running each operating system.

- Mac OS9:_____
- Mac OSX:_____
- Windows 98/2000:_____
- Windows XP:_____
- Windows Vista:_____
- Windows 7:_____
- Ubuntu/Edubuntu:_____
- Fedora Core:_____
- Other Linux:_____

Totals should equal 100%

Instructional Rooms and Locations of Instructional Computers

11. How many **instructional rooms** are in your building?
(Please include classrooms, library, computer labs, and other rooms used for group instruction.)

12. How many **MOBILE LABS** with computers are in your building, if any?
(NOTE: Please count each lab cart or set, but not individual computers.)

13. How many **classrooms** regularly share access to the number of MOBILE LABS indicated in the question above?

14. Please indicate the **total** number of computers (combine all Levels A,B,C, thin client, netbook) located in each instructional area listed below, available for student use:

- Laptop computers (all sizes) on mobile lab carts (don't double-count below)_____
- Computers stationed in labs and/or classrooms_____
- Computers stationed in media centers_____
- Computers dedicated to students with special needs_____

- Computers dedicated to a regional career & technical center_____

Computers for Teachers' Professional Use

15. How many teachers in your school have been provided with their own computer for their professional use (i.e., to prepare classroom materials and engage in professional development)?__ _____

Number of teachers with desktop computers:_____

Number of teachers with laptop or netbook computers:_____

16. How many of each type of **digital presentation tool** is available for use in your school?

- Digital data / LCD projectors: _____
- Dedicated video conferencing units (e.g., Tandberg): _____
- Large monitors (i.e., 32" or larger): _____
- Classrooms with access to cable TV: _____
- Interactive White Boards - InterWrite brand: _____
- Interactive White Boards - Mimeo brand: _____
- Interactive White Boards - PolyVision brand: _____
- Interactive White Boards - Promethean brand: _____
- Interactive White Boards - SmartBoard brand: _____

17. How many of each type of ***digital handheld tool*** is available for use *by students* in your school?

- Classroom set of student response systems (i.e., clickers) (don't count individually, just entire sets): _____
- Classroom set of iPod Touch (don't count individually, just entire sets): _____
- Number of iPod Touch units per classroom set: _____
- Digital cameras (still images, may have limited video capacity): _____
- Digital Video cameras: _____
- Image scanners: _____
- Portable digital audio players (i.e., MP3): _____
- PDA Handhelds (e.g., Palm, Handspring): _____
- Handheld game units (i.e., Nintendo DS): _____
- Portable keyboards (e.g., Neo, AlphaSmarts but not laptop computers): _____
- Global Positioning System (GPS Units): _____
- Robotics kits (e.g., Lego, Vex): _____
- Digital microscopes: _____
- Graphing calculators: _____
- Calculator Based Labs (CBLs) for use with graphing calculators (see www.vernier.com/mbl/cbl2.html): _____
- Data collection tools (e.g., sensors and probes): _____
- Data collection interfaces/loggers (e.g., Vernier LabPros, Hobo Loggers): _____

- Other digital tools not listed above: _____

Technology Access: Software

For most software questions, see the district level tech survey (i.e., student information systems, data warehousing, library automation, Internet filtering, adaptive assessment, and curriculum mapping software).

18. With the loss of the State Library purchase of online databases for schools, was your school be able to reallocate funds in order to cover purchase of these databases for the current (2010-11) school year?[61]

- Yes
- No

19. What other resources or services do you anticipate having to cut in order to fund these databases (check all that apply)?

- Books
- Periodicals
- Audiovisual materials
- Equipment
- Supplies
- Personnel

20. Have you consulted with library personnel to answer questions 18 & 19?

- Yes
- No

21. Does your school have a subscription for one or more classrooms to use any of the following web 2.0 types of resources (check all that apply)

- VoiceThread
- Edublogs
- Ning
- Other: _____

Technology Access: Connectivity to Online Resources

Internet & Wireless access

22. What is the total committed, currently purchased bandwidth to your school?[62]

_____

[61] Question appeared in the future tense for S10 survey.
[62] Question added to S11 survey. As a result, all question numbers were updated for S11 survey (i.e., questions 23-39 appeared as questions 22-38 on S10 survey).

- No connection
- Dial-up or 56K access
- ISDN, DSL, broadband/cable, or fractional T1
- Full T1, ATM, or greater

23. How many wireless access points to the Internet do you have in your school?
    Open access (no network key or password required):_____
    Protected access (requires network key or access:_____

Student access

24. Please tell us about your student profiles/account setup on your school or district network (i.e., students have access to storage of files over the network). Please check all that apply to your **SCHOOL** not your district.

- We do not have any student accounts setup.
- Grades K-2 have student accounts.
- Grades 3-5 have student accounts.
- Grades 6-7 have student accounts.
- Grade 8 has student accounts.
- Grades 9-12 have student accounts.
- Our students can access their accounts outside of the school building.
- Our school allows students to regularly send or receive emails through the school network using either school supplied or web based email accounts.
- Our school has conducted surveys to determine the percentage of students with Internet access at home.

25. If you have conducted surveys regarding home Internet access, what is the percentage of students that have Internet access at home?

- Less than 50%
- Between 50-74%
- Between 75-89%
- More than 90%

26. How much storage space do you allow each student? (This is a per student amount, not the total space available on your server)

- Less than 10MB per student
- Between 10MB - 99MB per student
- Between 100MB - 499MB per student
- Between 500MB - 1GB per student
- More than 1GB per student
- Unlimited storage per student

27. Has your school adopted Google Apps as standard practice for any of the following?

- Staff email

- Student email
- Google Sites for school website
- Google Sites for classroom websites
- Google Docs for staff use
- Google Sketchup or Sketchup Pro

Teacher/staff access

28. Please tell us about your teacher/staff access to file storage, email accounts, and editable web pages on your school or district network. Please check all that apply to your **SCHOOL** not your district.

- We do not have any teacher accounts setup on our network.
- All teachers have accounts setup on our network (i.e., teachers have access to file storage on the network).
- Our staff can access their files outside of school via web access.
- Our school provides email accounts for all staff.
- All staff can access their email accounts outside of school via web access.
- We have a policy or expectation for teachers to use their school **email address** as a primary school communication tool.
- We have a policy or expectation for teachers to **maintain a class web page** for access by parents and students to homework assignments and other information.

Comments:_____

29. Do teachers in your school indicate that Internet connection speed is adequate for their teaching needs? (NOTE: If you have it, use locally gathered data to respond to this question. Otherwise, please respond based on general discussions with teachers over the past year.)

- Most teachers are satisfied with the current Internet connection speed for planning regular classroom activities that use the Internet.
- About half of our teachers are satisfied with the current Internet connection speed for planning regular classroom activities that use the Internet.
- Few of our teachers are satisfied with the current Internet connection speed for planning regular classroom activities that use the Internet.

Online Content for Students

Please consult with the school guidance counselor(s) to answer the following questions.

30. Does your school currently purchase Internet based distance learning **content for students as supplementary material** to classroom learning? Please check all that apply.

- None
- Enchanted Learning
- Grolier Online

- Nettrekker
- OdysseyWare
- PLATO Learning
- Other (please specify):_____

31a. Does your school currently use a **course management system** for posting class materials, homework assignments, or other course work? Check all that apply[63]

- None
- Angel
- Blackboard
- Moodle
- Sakai
- Other (please specify):_____

31b. If your school does use a course management system, do you host it in-house or do you purchase hosting services from a hosting organization? Check all that apply.[64]

- Our course management system(s) are hosted in-house
- Our course management system(s) are hosted by a hosting organization
- I don't know
- Other (please specify): _____

32. Does your school currently use a **digital portfolio solution** for creating, viewing, and assessing student portfolios? Check all that apply.

- None
- Adobe Acrobat Pro
- Mahara
- Moodle
- Richer Picture
- Sakai OSP
- Other (please specify):_____

33. Does your school currently purchase Internet based distance learning **courses** for students as alternatives to face to face courses? Please check all that apply.

- None
- Virtual High School (GoVHS)
- Virtual Learning Academy Charter School (Free to NH students. See www.vlacs.org)
- Other (please specify):_____

34. Does your school currently use **two-way, real time video conferencing** for distance learning for students? Please check all that apply.

- None

[63] Appeared as question 31 in S10 survey.
[64] Did not appear on S10 survey.

- Adobe Breeze
- Elluminate
- Granite State Distance Learning Network (GSDLN)
- Dimdim
- GoToMeeting
- Skype
- Other (please specify):_____

Online Content for Teachers

35. Does your school currently use **two-way, real time video conferencing** for distance learning for students? Please check all that apply.

- None
- Adobe Breeze
- Elluminate
- Granite State Distance Learning Network (GSDLN)
- Dimdim
- GoToMeeting
- Skype
- Other (please specify):

Technology Access: Service & Support

Please help us understand your school's tech support model.

36. Please help us understand your in-school tech support model by checking each box if it applies to your school:

(***Response Options include*** *Hardware Maintenance, Software Support and, Curriculum Integration)*

- We have one or more paid full time staff dedicated to this at our school.
- We have one or more paid part time staff dedicated to this at our school.
- We provide stipends to one or more school staff as a building technology expert to handle these issues.
- We have a student program to provide support for this (i.e., GenYes or other).
- We have IT support from staff and/or students **without** specific compensation.

37. Are the majority of support services in your school (i.e., hardware, applications, and curriculum integration) provided by the same person(s)?

- Yes
- No

38. If the tech coordinator for your school also serves in other capacities, what are those other positions (i.e., principal, teacher, library media specialist, etc.)?_____

39. Please use this space to add any general comments you wish to make._____

Thank you for participating in this survey. When you have finished, please click "Submit" below to record your responses.

NH School ICT Literacy and Professional Development Survey

This survey is available in MS-Word format for download at www.nheon.org/oet/survey.

Questions?
For inquiries related to specific survey questions or their content, please contact Cathy Higgins at chiggins@ed.state.nh.us.

For inquiries relating to survey technical support, please contact Naomi Smoke-Zur at naomi@hezel.com.

IMPORTANT NOTES ABOUT THIS SURVEY

Designed as a comprehensive assessment of the overall technology environment within NH schools, this survey data can assist technology decision makers at both the local and state level. There is a companion survey for the district level with DIFFERENT questions. (*Note: If your district is composed of a single school, you should complete both the district and the school surveys because the* ***questions are different***.)

The New Hampshire Department of Education (NHDOE) relies on this survey data to evaluate the extent to which the state and its schools are effectively implementing technology plans and programs. Survey data also helps verify compliance with federal and state technology requirements. **Districts receiving Title II-D grants are REQUIRED to complete this survey as part of their grant evaluation reporting.**

The school survey is divided into TWO parts:
(1) Technology Access (hardware, connectivity to online resources, service & support)
(2) ICT Literacy and Professional Development

For your convenience in gathering data for this survey, it is available in MS-Word format. We strongly encourage you to download the Word version and save your responses in Word format for future reference. Go to www.NHEON.org/oet/survey to access both the Word and the online versions of this survey and the district survey.

Please be sure to consult with other staff in your school to provide the most informed answers possible.

DATA COLLECTION: We strongly suggest that you gather your data using the Word Version of the survey and then go back and enter your responses in the survey system.

MAKING CHANGES: You will not be able to make any changes to your survey once it has been submitted.
NUMERIC RESPONSES: For all questions that require numeric responses, you may only include decimal points. Please do not input any other characters or symbols ($,%).

This SURVEY will CLOSE on March 11, 2011.

General

1. School Name (all schools appearing in the list are organized alphabetically by district):
   - Districts A-G
   - Districts H-M
   - Districts N-Z

2. Contact (person completing survey): _____

3. Your position:
   - Principal, Assistant Principal, Other Administrator
   - Tech Director/ Coordinator
   - Ed Tech Integrator / Tech Integration Specialist
   - Library Media Specialist / School Librarian
   - Classroom Teacher
   - Other: _____

4. Your email address: _____

Technology / ICT Literacy

On 7/1/05, New Hampshire adopted a revised set of School Minimum Standards, including standards for Information and Communication Technologies (ICT) Literacy (Ed 306.42). Since that time, schools have been updating their instructional programs to meet the new standards. Please tell us how your school currently addresses technology literacy (i.e., ICT Literacy) instruction and assessment, so we can plan future technical assistance. Please answer as accurately as possible on behalf of your SCHOOL (not the whole district). You can find more information about these standards at: www.nheon.org/ictliteracy.

NOTE: When there are choices of several grades, please check ONLY those that apply to your school.

5. Please indicate which staff positions and to what extent each staff is involved in the process of updating your instructional program to address these ICT Literacy standards.[65]
Scale: *A lot, Some, A little, not at all*
   - Principal / Assistant Pr.
   - Library Media Specialist
   - Technology Coordinator / Director
   - Computer Teacher and/or Ed Tech Integrator
   - Content Area Teachers

[65] Question 5 and 6 appeared as 5a and 5b on the S10 survey. As a result, all question numbers were updated for S11 (i.e. questions 7-22 appeared as 6-21 on S10 survey).

- Special Ed Staff
- Other (please specify): _____

6. Please indicate which staff positions and to what extent each staff is involved in projects which support learning powered with technology, such as Digital Tools grants, Classroom Tech Minigrants, Tech Leader Cohort, or other ed tech projects.
Scale: *A lot, Some, A little, not at all*

- Principal / Assistant Pr.
- Library Media Specialist
- Technology Coordinator / Director
- Computer Teacher and/or Ed Tech Integrator
- Content Area Teachers
- Special Ed Staff
- Other (please specify): _____

7. Please describe briefly (in a few sentences) how your school is implementing these standards, such as what grade levels are involved, what you have done, who has been involved, any areas you are emphasizing, etc._____

8. Please indicate how **your school** (not the whole district) currently provides instruction in ICT literacy. *Check all that apply to indicate what activity occurs and in which grade.*
(Answer choices included: Grades K-2, Grades 3-5, Grades 6-7, Grade 8, Grades 9-12)

- Our students take a separate ICT Literacy class, Computer Literacy class, or something similar.
- We embed ICT literacy instruction into our curriculum in various content areas.
- We engage students in project based learning using digital tools (ICT tools).
- We assist our students to create digital portfolios of their work.
- ICT literacy instruction is part of our library media and/or media literacy program.
- We use the resources available at www.newmedialiteracies.org as part of our program materials.
- We use the resources available at www.commonsensemedia.org as part of our program materials

9. Please tell us how your school addresses **Internet safety** instruction.
(Answer choices included: Grades K-2, Grades 3-5, Grades 6-7, Grade 8, Grades 9-12)

- We have no formal Internet safety program.
- Our instruction is varied, with teachers selecting or creating their own materials
- We have created and are using **our own** customized Internet safety curriculum.
- We use the **Common Sense Media** curriculum.
- We use the **iSafe** curriculum.
- We use the **CyberSmart** curriculum.
- We use **NetSmartz** materials.

Comments or other materials used: _____

Technology / ICT Literacy

10. Please tell us how students at your school work with digital files. Check to indicate in which grade the activity is occurring.
(Answer choices included: Grades K-2, Grades 3-5, Grades 6-7, Grade 8, Grades 9-12)

- Our students are now regularly storing their digital files to a folder on the server.
- Our students have been taught to use a standard file naming protocol when saving files to the server so that they can more easily locate specific assignments later.
- Our students have spent some time reviewing and reflecting on their digital work.
- Our students have spent some time organizing and assembling collections of their work into actual digital portfolios.
- Other (specify below)

Comments:_____

11. Please identify the digital portfolio solution in use at your school.
(Answer choices included: Grades K-2, Grades 3-5, Grades 6-7, Grade 8, Grades 9-12)

- Simple file storage in folders on our server
- Adobe Acrobat Pro
- Richer Picture
- Moodle
- Moodle with Mahara
- Sakai OSP

Comments:_____

12. Please indicate how **your school** (not the whole district) currently **assesses** students' ICT literacy skills. *Check to indicate in which grade the activity is occurring.*
(Answer choices included: Grades K-2, Grades 3-5, Grades 6-7, Grade 8, Grades 9-12)

- We use a test to assess students' skills at least once in these grades.
- We use rubrics to assess students' digital portfolio work at least once in these grades.
- We assess students' ICT competency in other ways in these grades.
- We use the NH common ICT Literacy rubrics available at www.nheon.org/ictliteracy (as is).
- We use the NH common ICT Literacy rubrics (with adaptations by our district).

If other ways, please describe how you assess:_____

13. How many 8th grade students were enrolled in your school in 2009-10 as of 10/1/09?[66]

_____

14. How many 8th grade students were enrolled in your school in 2010-11 as of 10/1/10?[67]

_____

_____

[66] S10 survey asked about students enrolled in 2008-09 as of 10/1/08.
[67] S10 survey asked about students enrolled in 2009-10 as of 10/1/10.

15. In 2010-11, how many 8th grade students have met or will have met the following ICT competency requirements by the end of 8th grade? (If your school does not include 8th grade, skip this question.)[68]

- Technology operations and concepts: _____
- Digital citizenship / social, ethical, human issues: _____
- Creativity & innovation / productivity tools: _____
- Communication & collaboration / communication tools: _____
- Research & information fluency / research tools: _____
- Critical thinking, problem solving, & decision making: _____
- TOTAL NUMBER OF STUDENTS HAVING MET ALL REQUIREMENTS (Please be careful not to double count them. This number should not exceed your answer to question 14.): _____

Professional Development

Please consult with your principal and staff development coordinator to answer the following questions.

16. Based on the goals of your District Professional Development Master Plan, most recent curriculum development efforts, and your school's state assessment results, please rate the following professional development topics to indicate those that are most needed at your school.
PART A
***Scale** includes not a priority for us right now, Important but not our highest priority, Highest priority.*

- Basic Technology Skills for Teachers (includes various topics to integrate digital tools)
- Evaluating Websites & Using Online Resources
- Creating and Maintaining Effective Websites and Blogs
- Using Wikis as an Alternative to Textbooks
- Using Online Course Mgmt Systems for Classwork and Homework (i.e., Moodle, Sakai, etc.)
- Internet Safety, Web 2.0, and Digital Citizenship
- Assessment Rubrics for ICT Literacy
- Working with Digital Portfolios
- Integrating Interactive Whiteboards
- Using Data Analysis to Inform Classroom Instruction (i.e., NWEA, Perf. Pathways,
- Data Teams, EasyIEP)
- Technology Planning, Budgeting, and E-Rate Discounts

Our tops needs are not listed, they are as follows:_____

[68] S10 survey asked about the 2009-10 school year; S11 included additional text regarding "will have met."

17. Based on the goals of your District Professional Development Master Plan, most recent curriculum development efforts, and your school's state assessment results, please rate the following professional development topics to indicate those that are most needed at your school.
PART B
Scale *includes not a priority for us right now, Important but not our highest priority, Highest priority.*

- Understanding Formative & Summative Assessment
- Assessing Student Competencies
- Communication (incl. home-school connections, etc.)
- Curriculum Mapping/Integration
- Differentiated Instruction & Multiple Intelligences
- Improving Instruction in Core Content Areas
- Improving Writing
- Improving Reading & Literacy Skills
- Instruction based on NH Math Standards
- Instruction based on NH Science Standards
- Special Education Training
- PBIS, Responsive to Intervention (RTI), Classroom Mgmt
- Understanding by Design (Backward Design)

Our tops needs are not listed, they are as follows:_____

18. Does your school provide teachers with time during regular school hours for learning and professional development growth opportunities including the integration of technology?

- Yes
- No

19. Do you currently provide Internet safety training to staff?

- Yes
- No

Professional Development

Please help us understand the types and frequency of district-provided technology related professional development your teachers
participated in during the previous academic year. (You might consider posting these questions in the teachers' lounge to gather more accurate data directly from them.)

* For your reference, there are Local Educational Support Centers in Penacook (Capital Area Center for Educational Support), Manchester (Greater Manchester Professional Development Center), Gorham (North Country Professional Development Center), Exeter (Seacoast Professional Development Center), Keene (Southwestern NH Educational Support Center), and Claremont (Sugar River Professional Development Center).

20. Over the past year, about how many teachers in your school participated or will participate in training with each provider type?[69]
Answer choices: *No staff participation (0%), Participation by a few (less than 30%), Participation by several staff (between about 30%-70%), Most or all of staff participated (>70%)*

- District on-site PD
- PD activities at Local PD Center*
- PD activities at SERESC
- Online courses from OPEN NH
- Online courses from other providers
- College/university graduate courses
- Thinkfinity/MarcoPolo workshops
- Intel workshops
- NHSTE workshops or summer inst.
- Christa McAuliffe Tech Conference
- NHEMA/ NHSLMA Conference
- NHPTV Knowledge Network workshops
- Other face to face PD

21. The following topics originate from the National Educational Technology Standards for Teachers (NETS-T) (revised 2008 draft). Please indicate the extent of need for professional development among teachers in your school related to each topic.
Answer choices: *Not much needed because we regularly address this; Somewhat need because we have only been able to address this at a modest level; Very great need. This is very important to us, but we have not been able to address this sufficiently.*

- **Creativity and Innovation**: Teachers demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology.
- **Communication and Collaboration**: Teachers use digital media and environments to communicate and work collaboratively, including at a distance, to promote and support the learning of both students and colleagues.
- **Research and Information Fluency**: Teachers model and facilitate the effective use of current and emerging digital tools to gather, evaluate, and use digital information resources to support learning and assessment in both formal and informal learning environments.
- **Critical Thinking, Problem-Solving, and Decision-Making**: Teachers use critical thinking skills to plan strategies, solve problems and make informed decisions related to teaching and learning using digital tools and resources.
- **Digital Citizenship and Responsibility**: Teachers understand the cultural, human, legal, and societal issues associated with technology and exhibit legal and ethical behavior in their professional practices.

[69] "or will participate" was added to S11 survey.

- **Technology Operations and Concepts**: Teachers demonstrate and model for students a sound understanding of technology concepts, systems, and operations.
- **Professional Practice and Leadership**: Teachers continually improve their professional practice and exhibit leadership skills representative of an innovative professional in a global, digital society.

22. Please tell us any additional information about school technology, which you believe, is important for the NH Department of Education to know. This might include new uses of tools that seem to be having an impact on student learning, such as iPods, science probes, or laptops used for specific content areas, how used, frequency of use, grade level, etc.

_____

T*hank you for participating in this survey. When you have finished, please click "**Submit**" below to record your responses.*

Focus Group Protocols

Protocol for E2T2 **Administrator** Focus Groups Spring 2010

Prior to the start of the group, each participant must complete the Sign In Sheet and sign a Consent form. Those who do not complete the Consent form cannot participate.

Hello, I'm _____ from Hezel Associates. We are working on the statewide evaluation of New Hampshire's E2T2 program. I would like to ask you some questions about your experiences and views regarding the use of technology in the classroom and the upcoming implementation of your E2T2 technology. Your responses are confidential and will not be shared with anyone outside of Hezel Associates. We will be summarizing your responses to appear in reports to NHDOE, however responses will be reported in aggregate and no identifying information will be included. I will be audio taping this conversation to enhance my notes. I'll also be taking written notes during the interview, so don't be concerned if I pause once in a while.

Begin the recording with the name of the school/district and the type of group (teacher/administrator).

1. How was technology being used in your school prior to your schools involvement with the Title IID/E2T2 program? *(probe for what and how frequent)*
    - What are some of the most effective ways in which teachers have used technology with students in the past?

2. In general, what do you perceive to be the comfort level of your teachers in using technology as an instructional tool in the classroom?

3. Do you believe that the use of learning technologies will impact academic achievement for your students?
    - If so, what impact do you expect to see (*probe for evidence demonstrating impact).*

4. As a result of the E2T2 grants, your school will be implementing some new technology.
    - What factors do you feel might help teachers and students use the new technology?
    - What factors do you feel might make the use of the new technology more difficult?

5. Does your school or district currently have or plan to have any mechanisms to allow teachers to regularly share ideas about the ways they plan to use technology with their colleagues?

6. How committed is your district to improving student achievement through the use of technology?
    - (if committed): Would you then consider this to be a priority for the district?

- What else could your district do to support you or your school in improving student achievement through the use of technology?

7. Do you foresee any challenges that may impact the implementation of the new technology or the attainment of the project goals identified on the grant application?

8. Have you or your teachers received any professional development or training on the new technology your school will be receiving?

    - If so, how satisfied were you with that training?
        - In what ways did the training help you or your teachers? (*Probe for subject area knowledge, standards, pedagogy*)?
    - If not, who will train you and your teachers in the software and hardware?
        - Will the training be ongoing?
        - Do you think the planned training activities will meet the immediate needs of your school?
        - Why/why not?

9. Is there anything else you would like to share at this time?

(Sources: California Department of Education, "California Math Science Program (CaMSP) 2005 Report"; SETDA/Metiri Group, "Observation Tools for School Observers"; Zucker, Andrew A. et al., "A Study of One-to-One Computer Use in Mathematics and Science Instruction at the Secondary Level in Henrico County Public Schools")

Protocol for E2T2 **Teacher** Focus Groups Spring 2010

Prior to the start of the group, have each participant complete the Sign In Sheet and sign a Consent form. Those who do not complete the Consent form cannot participate.

Hello, I'm _____ from Hezel Associates. We are working on the statewide evaluation of New Hampshire's E2T2 program. I would like to ask you some questions about your experiences and views regarding the use of technology in the classroom and the upcoming implementation of your E2T2 technology. Your responses are confidential and will not be shared with anyone outside of Hezel Associates. We will be summarizing your responses to appear in reports to NHDOE; however responses will be reported in aggregate and no identifying information will be included. I will be audio taping this conversation to enhance my notes. I'll also be taking written notes during the interview, so don't be concerned if I pause once in a while.

Begin recording session with the name of the school/district and the type of group (teacher/administrator).

1. Prior to your involvement with Title IID/E2T2 program, did you use technology in your classroom? *(probe for what and how frequent)*
    - If so, what were some of the most effective ways in which you've used technology with your students?

2. What is your comfort level using technology both for yourself and as an instructional tool in the classroom?

3. Do you believe that the use of learning technologies will impact academic achievement for your students?
    - If so, what impact do you expect to see (*probe for evidence demonstrating impact*)?

4. As a result of the E2T2 grants, your school will be implementing some new technology.
    - What factors do you feel might help teachers and students use the new technology?
    - What factors do you feel might make the use of the new technology more difficult?

5. Does your school or district currently have or plan to have any mechanisms to allow teachers to regularly share ideas about the ways they plan to use technology with their colleagues?

6. How committed is your **school** to improving student achievement through the use of technology?
    - (if committed): Would you then consider this to be a priority for the school?
    - What else could your school do to support you in improving student achievement through the use of technology?

7. How committed is your **district** to improving student achievement through the use of technology?
    - (if committed): Would you then consider this to be a priority for the district?
    - What else could your **district** do to support you or your school in improving student achievement through the use of technology?

8. Do you foresee any challenges that may impact the implementation of the new technology or the attainment of the project goals identified on the grant application?

9. Have you received any professional development or training on the new technologies you will be receiving?
    - If so, how satisfied were you with that training?
        - In what ways did the training help you (*probe for subject area knowledge, standards, pedagogy*)?
    - If not, who will train you in the software and hardware?
        - Will the training be ongoing?
        - Do you think the planned training activities will meet your immediate needs?
        - Why/why not?

10. Is there anything else you would like to share at this time?

(Sources: California Department of Education, "California Math Science Program (CaMSP) 2005 Report"; SETDA/Metiri Group, "Observation Tools for School Observers"; Zucker, Andrew A. et al., "A Study of One-to-One Computer Use in Mathematics and Science Instruction at the Secondary Level in Henrico County Public Schools")

Protocol for ARRA Grant Program Administrator Focus Groups Spring 2011

Prior to the start of the group, each participant must complete the Sign-in Sheet and sign a Consent form. Those who do not complete the Consent form cannot participate.

Hello, I'm _____ from Hezel Associates. We are working on the statewide evaluation of New Hampshire's ARRA Grant Program. I would like to ask you some questions about your experiences and views regarding the use of technology in the classroom and the implementation of your ARRA technology. Your responses are confidential and will not be shared with anyone outside of Hezel Associates. We will be summarizing your responses to appear in reports to NHDOE; however responses will be reported in aggregate and no identifying information will be included. I will be audio taping this conversation to enhance my notes. I'll also be taking written notes during the interview, so don't be concerned if I pause once in a while.

Begin recording session with the name of the school/district and the type of group (teacher/administrator).

1. What were some of teachers' most effective uses of technology in classrooms during the ARRA program? *(probe for evidence)*
    - How has their use of technology as an instructional tool changed as a result of participating in the ARRA grant?

2. How do you think the comfort level of teachers in your school or district in using technology as an instructional tool in the classroom has changed as a result of their participation in the ARRA grant?
    - What factors do you feel have helped teachers and students use the new technology and integrate it into the classroom?
    - What factors do you feel have made the use of the new technology more difficult in the classroom?
        - Was your school or district able to alleviate these difficulties? If yes, how?

3. What impacts have the new learning technologies obtained through the ARRA grant had on academic achievement for your students? *(probe for evidence)*
    - What impacts have the technologies had on student engagement? *(probe for evidence)*

4. How committed has your **district** been to improving student achievement through the use of technology?
    - *(if committed)*: Would you then consider this to be a priority for the district?
    - What else could your district have done or do in the future to support you or your school in improving student achievement through the use of technology?

5. What professional development or training on the new technology did your school or district provide to staff members?
    - How satisfied was your staff with that training?
        - In what ways did the training help you or your teachers? (*Probe for subject area knowledge, standards, pedagogy*)?
    - Who trained you and your teachers in the software and hardware?
        - Do you think the training activities met the immediate needs of your school? Why/why not?
        - Will the training continue next year or in future school years?

6. Does your school/district have a sustainability plan to allow for continued implementation of instructional technology and training once the grant period has ended? If yes, please describe.

7. Did you meet the project goals identified on the grant application? Why or why not?

8. Are there any "lessons learned" that would be helpful to share with other schools and/or districts implementing similar technology initiatives?

9. What mechanisms did your school or district have to allow teachers to regularly share ideas about the ways they plan to use technology with their colleagues, if any?

10. Is there anything else you would like to share at this time?

(Sources: California Department of Education, "California Math Science Program (CaMSP) 2005 Report"; SETDA/Metiri Group, "Observation Tools for School Observers"; Zucker, Andrew A. et al., "A Study of One-to-One Computer Use in Mathematics and Science Instruction at the Secondary Level in Henrico County Public Schools")

Protocol for ARRA Grant Program Teacher Focus Groups

Prior to the start of the group, have each participant complete the Sign-in Sheet and sign a Consent form. Those who do not complete the Consent form cannot participate.

Hello, I'm _____ from Hezel Associates. We are working on the statewide evaluation of New Hampshire's ARRA Grant Program. I would like to ask you some questions about your experiences and views regarding the use of technology in the classroom and the implementation of your ARRA technology. Your responses are confidential and will not be shared with anyone outside of Hezel Associates. We will be summarizing your responses to appear in reports to NHDOE; however responses will be reported in aggregate and no identifying information will be included. I will be audio taping this conversation to enhance my notes. I'll also be taking written notes during the interview, so don't be concerned if I pause once in a while.

Begin recording session with the name of the school/district and the type of group (teacher/administrator).

1. What were some of the most effective uses of technology in your classroom during the ARRA program? *(probe for evidence)*
    - How has your use of technology as an instructional tool changed as a result of participating in the ARRA grant?
    - How well do you think you integrated technology into your instruction and curriculum? *(focus on integration, not on sheer use of technology in the classroom)*

2. How has your comfort level in using technology as an instructional tool in the classroom changed as a result of participating in the ARRA grant?
    - What factors do you feel have helped teachers and students use the new technology and integrate it into the classroom?
    - What factors do you feel have made the use of the new technology more difficult in the classroom?
        - Was your school or district able to alleviate these difficulties? If yes, how?

3. What impacts have the new learning technologies obtained through the ARRA grant program had on academic achievement for your students? *(probe for evidence)*
    - What impacts have the technologies had on student engagement? *(probe for evidence)*

4. What mechanisms did your school or district have to allow teachers to regularly share ideas about the ways they plan to use technology with their colleagues, if any?

5. How committed has your **school** been to improving student achievement through the use of technology?
    - *(if committed)*: Would you then consider this to be a priority for your school?
    - What else could your **school** have done or do in the future to support you in improving student achievement through the use of technology?

6. How committed has your **district** been to improving student achievement through the use of technology?
    - *(if committed)*: Would you then consider this to be a priority for the district?
    - What else could your **district** have done or do in the future to support you or your school in improving student achievement through the use of technology?

7. Does your school/district have a sustainability plan to allow for continued implementation of instructional technology and training once the ARRA grant period has ended? If yes, please describe.

8. Are there any "lessons learned" that would be helpful to share with other schools and/or districts implementing similar technology initiatives?

9. What professional development or training on the new technologies did you receive?
    - How satisfied were you with that training?
        - In what ways did the training help you (*probe for subject area knowledge, standards, pedagogy*)?
    - Who trained you in the software and hardware?
        - Did the training activities meet your immediate needs? Why/why not?
        - Will the training continue next year or in future school years?

10. Is there anything else you would like to share at this time?

(Sources: California Department of Education, "California Math Science Program (CaMSP) 2005 Report"; SETDA/Metiri Group, "Observation Tools for School Observers"; Zucker, Andrew A. et al., "A Study of One-to-One Computer Use in Mathematics and Science Instruction at the Secondary Level in Henrico County Public Schools")

NH Case Study Report

Effective Projects Case Study Interim Report[70]
2011

This case study report form is provided by the Office of Educational Technology (OET) at the New Hampshire Department of Education to gather descriptive information from K-12 schools on specific projects (i.e., larger district-wide initiatives or smaller projects involving one or more classrooms) that have helped to create 21st century learning environments. **Use this form to tell your story about a project that is making a difference.**

This form can be used for projects that were funded with federal technology dollars *as well as* projects that were supported by local or other funding sources. Please complete all questions and save this document for your records. Then go to www.nheon.org/oet to enter your case study into the online database.

General Information *(Replace the gray text with your specific data and narrative.)*

1. School District Name:	District or Charter School
2. Project Contact:	First Name, Last Name, Position Title
3. Project Contact Email:	Your Email Address
4. Project Name:	Tell us the name you use for this project
5. Link to Website/URL:	Website describing your project. If none exists, enter your school website address.
6. Date the Project Started:	Month and year the project began
7. Date the Project Ends:	Month and year the project ends
8. Brief Project Description:	Write a brief project description in 150 words or less. Think about the key message or idea you want to convey about this project.
9. Which federal grant funds, if any, helped to support the project? (Check all that apply)	☐ NCLB Title II-D (Educational Technology) ☐ Other - please specify: _____ ☐ This project was (partially or fully) funded by local dollars.
10. Type of NH Title II-D grant project, if applicable:	☐ ARRA Title II-D ☐ Classroom Technology Mini-grant ☐ Tech Leader Cohort (TLC) Program ☐ Digital Tools Grant ☐ Digital Resources Consortium

[70] This case study template, provided by the Office of Educational Technology (OET) at the New Hampshire Department of Education, is derived from a similar template developed by the State Educational Technology Directors Association (www.SETDA.org) with additional storytelling text from the ISTE Advocacy Stories Template (www.ISTE.org). Rev. 02-21-11

	☐ Not applicable
11. What was the federal grant amount?	Approximate dollar total (just dollars, no cents)
12. What was the amount of local funds that helped support this project?	Approximate dollar total (just dollars, no cents)

Program Category

13. Using a ranking system, indicate which categories **best** describe the topic your project illustrates? Mark the most closely aligned category with a '1,' your second most closely aligned category with a '2,' and so forth. If your project did not address a topic, leave it unmarked.	☐ **Access** - Enhancing existing technology and acquiring new technology to support education reforms and improve student achievement (includes servers, desktops, laptops, peripherals) ☐ **Technology literacy for all students** - Implementing systemic changes through robust curriculum integration with technology (includes student work with digital tools, distance learning courses, etc.) ☐ **Professional development through teacher leaders** - Preparing one or more teachers in schools as tech leaders to assist other teachers ☐ **Professional development to all staff** - Supporting ongoing, sustained, intensive, high-quality professional development for all staff focused on integration of technology into curriculum and instruction ☐ **Community** - Using technology to promote parental involvement and foster communication among students, parents, and teachers about curricula, assignments, and assessments ☐ **Data collection and analysis** – Implementing individualized instruction by collecting, managing, and analyzing data to inform and enhance teaching and school improvement efforts.
14. Grades impacted:	Indicate all grade levels being impacted by the project.
15. Content areas addressed:	☐ELA ☐Math ☐Science ☐SocSt ☐Arts ☐Other If Other, please specify_____

Initial Planning and Implementation

16. Setting and strongest driving force:	**The Setting:** Give your audience a sense of place. Is it an urban, rural, or suburban setting? Is it technology rich or barely equipped? Help others to imagine where you're coming from.
17. Biggest planning challenge and how it was overcome:	**The Plot:** What was the biggest planning challenge? What happened that was compelling? What was the source of tension or catalyst for change? How did you overcome these challenges?
18. Biggest implementation	**The Plot Thickens:** What was the biggest implementation

challenge and how it was overcome:	challenge and how did you overcome this challenge?

Evaluating Effectiveness

19. How many teachers were directly involved in this project, and what role(s) did they play?	**Key Characters:** Indicate the number of teachers that were directly involved. Describe them and why they were important to the story.
20. Describe how this project supported effective teaching approaches.	Describe the students and other characters important to the project. How did this project support effective teaching approaches which impacted students?
21. Describe how this project infused technology with curriculum and instruction.[71]	Describe activities and strategies used to effectively infuse technology with curriculum and instruction.
22. Which of the following statewide NH Title II-D instruments did you use to collect data? (Check all that apply.)	☐ NH Walkthrough Observation Tool (accessed at Hezel.com) ☐ NH Educator Survey (accessed at Hezel.com) ☐ NH Student Survey (accessed at Hezel.com) ☐ NHDOE STaR Chart ☐ NHDOE District Technology Survey ☐ NHDOE School Technology Surveys ☐ Other: We used instruments that have been developed by other organizations (e.g., LoTi Digital-Age Survey). ☐ Other: We developed our own local, site-specific instruments internally.
23. Names of other instruments and how they were implemented:	If Other instruments were used (either developed externally or internally), identify them here and describe their implementation.
24. Data analysis plan as part of local evaluation plan:	For all instruments used, explain how you have analyzed or plan to analyze the data, and how they were/will be integrated into your local evaluation plan.
25. List any known gains in student achievement and how you measured them.	**Outcome:** Where there any student achievement gains? Other outcomes? How did you measure them?
26. Provide any other data that supports your conclusions about project impact.	**Why it matters:** Are there other data to demonstrate the impact of this project? What is the value of sharing this information?
27. Identify the essential conditions necessary for success of your project.	What were the essential conditions that made this project successful?

[71] This question only appeared on the Spring 2011 Case Study Report; therefore, all subsequent numbers were shifted from the Spring 2010 form.

Making Improvements

28. How would you change the way you implement this project in the future?	Implementation changes ☐ Not Applicable, no changes at this time.
29. How would you change the way you evaluate this project in the future?	Evaluation changes ☐ Not Applicable, no changes at this time.

Sharing the Benefits

30. Dissemination of program impact:	How do you plan to share the impact your project has had in your school (e.g., newsletters, reports), and with whom do you plan to share this impact?
31. Recommendations for other schools:	What recommendations do you have for other school districts interested in replicating your project?
32. Do you have any leadership documents that promote the project that you can share with others? If so, please post to your website and indicate here the names of those documents (e.g., sample letters, talking points, presentations)	List of documents
33. Sustainability[72]	Please describe any sustainability plans (school/district) to allow for continued implementation of instructional technology and training once the ARRA grant period has ended.

[72] This question only appeared on the Spring 2011 Case Study Report.

Walkthrough Observation Tool

Note to observer: Prior to any walkthrough being conducted, the teacher whose classroom will be observed needs to have completed a consent form. If you have any questions, please see the information posted on http://www.nheon.org/oet/survey/

Observer Name: _____

School Name (all schools appearing in the list are organized alphabetically by district): [drop-down]

Date of Observation:
Month: [drop-down]
Day: [drop-down]
Year: [drop-down]

Start Time:
Hour: [drop-down]
Minutes: [drop-down]

Teacher Name: _____

Grade Level(s) (2009-2010; check all that apply):

- Kindergarten
- 1st Grade
- 2nd Grade
- 3rd Grade
- 4th Grade
- 5th Grade
- 6th Grade
- 7th Grade
- 8th Grade
- 9th Grade
- 10th Grade
- 11th Grade
- 12th Grade

Type of NH Title II-D project(s) in which teacher is participating (check all that apply):

- ARRA/Title II-D
- Mini-grant
- TLC (Technology Leadership Cohort)
- Not Applicable

Teacher Group Membership:

- Grant participant

- Not a grant participant

Number of students in room: _____

Number of adults in room (excluding teacher):_____

Roles of additional adults in room (not including regular classroom teacher)? (check all that apply)

- Parent
- Technology facilitator
- Special Education teacher
- Paraprofessional/Aide
- Teacher
- Administrator
- Other

If other, please specify: _____

Dominant Teacher Activity:

- Lecture
- Providing directions
- Demonstration
- Questioning
- Facilitation
- Feedback
- Monitoring
- Informal assessment
- Sitting at desk
- Troubleshooting
- Other

If other, please specify: _____

Primary Class Grouping Structure:

- Whole class
- Small group- non-cooperative
- Small group-cooperative
- Partners
- Individual

Dominant Student Activity:
Completing worksheet

- Answering questions
- Note-taking
- Discussion
- Presenting
- Completing hands-on activity

- Listening
- Writing/Creating
- Downtime/No instructional activity is taking place
- Off-task
- Other

If other, please specify: _____

Student Cognitive Level (check all that apply):

- Remembering
- Understanding
- Applying
- Analyzing
- Evaluating
- Creating
- Not observed

Proportion of Students Engaged:

- No students are engaged
- Less than half of students are engaged
- About half of students are engaged
- More than half of students are engaged (but not almost all)
- Almost all students are engaged
- All students are engaged

Classroom Hardware Access (check all that apply):

- Desktop computers
- Laptop computers
- Thin Clients
- Netbooks
- Digital Presentation Tools
- Digital Handheld Tools
- Assistive Technology
- None
- Other

If other, please specify: _____

Teacher Technology Use (check all that apply):

- Administrative (e.g., grading, record-keeping)
- Assessment / Testing
- Digital Portfolio (organizing, managing, reflecting)
- Assistive (e.g., screen reader)
- Computer-Assisted Instruction / Integrated Learning System
- Thinking tools (e.g. visual organizer, simulation, modeling, problem-solving)

- Hardware-Embedded (e.g. digital white board, GPS/GIS, digital interactive response system)
- Multimedia (e.g., digital video editing)
- Productivity Software (e.g., database, presentation, spreadsheet, word processing)
- Programming or web scripting (e.g., Javascript, PHP, Visual Basic)
- Graphics / Publishing (e.g., page layout, drawing/painting, CAD, photo editing, web publishing)
- Subject-specific software
- Subject-specific hardware (e.g., science probes)
- Web Browser (e.g., MS Internet Explorer, Safari, Firefox)
- Web Applications: Course management software (Moodle, Sakai, etc.)
- Web Applications: Database systems
- Web Applications: Libraries, E-publications
- Web Applications: Search engine
- Web Applications: Synchronous communication tools (e.g., Video, voice, or real-time text conference)
- Web Applications: Asynchronous communication tools (e.g., blogs, Wiki, discussion board, email)
- Technology is not in use by the teacher
- Other

If other, please specify: _____

Student Technology Use (check all that apply):

- Administrative (e.g., grading, record-keeping)
- Assessment / Testing
- Digital Portfolio (organizing, managing, reflecting)
- Assistive (e.g., screen reader)
- Computer-Assisted Instruction / Integrated Learning System
- Thinking tools (e.g. visual organizer, simulation, modeling, problem-solving)
- Hardware-Embedded (e.g. digital white board, GPS/GIS, digital interactive response system)
- Multimedia (e.g., digital video editing)
- Productivity Software (e.g., database, presentation, spreadsheet, word processing)
- Programming or web scripting (e.g., Javascript, PHP, Visual Basic)
- Graphics / Publishing (e.g., page layout, drawing/painting, CAD, photo editing, web publishing)
- Subject-specific software
- Subject-specific hardware (e.g., science probes)
- Web Browser (e.g., MS Internet Explorer, Safari, Firefox)
- Web Applications: Course management software (Moodle, Sakai, etc.)
- Web Applications: Database systems
- Web Applications: Libraries, E-publications
- Web Applications: Search engine

- Web Applications: Synchronous communication tools (e.g., Video, voice, or real-time text conference)
- Web Applications: Asynchronous communication tools (e.g., blogs, Wiki, discussion board, email)
- Technology is not in use by the students
- Other

If other, please specify: _____

Student:Device Ratio

Number of students using devices: _____

Number of devices in the room: _____

ISTE NETS-S Standard Addressed (check all that apply):

- Creativity and innovation
- Communication and collaboration
- Research and information fluency
- Critical thinking, problem solving, and decision making
- Digital citizenship
- Technology operations and concepts
- None
- Not observed
- I am not familiar enough with ISTE NETS-S to make observation

Teacher's Technology Virtuosity (check all that apply):

- Teacher limits self and student learning of new technology skills to those planned for in the activity
- Teacher relies on prepared materials to help students learn new technology skills
- Teacher acknowledges students discovery of new technology skills
- Teacher actively facilitates students' discovery of new technology skills
- Teacher actively discovers new technology skills in collaboration with students
- Use and learning of new technology skills was not observed

Student Hands-On Technology use (check all that apply):

- Students observe teacher using technology
- Students use technology with explicit direction from teacher
- Students independently control technology to complete the activity
- Students select from limited technology options to meet learning needs
- Students adapt or choose from a broad range of technologies to meet their needs
- Use of technology by either teacher or students was not observed

Evidence of technical issues?

- Yes
- No
- No technology use observed

Finish Time:
Hour: [drop-down]
Minutes: [drop-down]

When you have completed this form, please click "Submit"

Student Survey for Grades 4-12

Thank you for taking the time to complete our survey! Please be assured that your participation is voluntary, and your identity and responses will be anonymous and confidential. We only ask for your name so that we can match your survey to the consent form that your parent or guardian may have completed.

Directions: It should take about 15-20 minutes to complete the survey. Please select the answer that best matches your response. There are no right or wrong answers, and any information you provide will remain confidential. Your answers to the questions below will help us understand how computers and other tools are changing the way students learn. We greatly appreciate your help!

For this survey, "technology" includes computers, netbooks, smartphones, iPads, interactive whiteboards, sensors, the Internet, etc.

First Name:_____ Last Name:_____

1. Which school do you attend? (List of schools alphabetically)
   If Other please specify:_____

2. Are you a:
   - Male
   - Female

3. What is your ethnicity?
   - American Indian/Alaskan Native
   - Asian American
   - Black/African American
   - Hispanic/Latino
   - White
   - Other

4. Which grade are you in?
   - 4th grade
   - 5th grade
   - 6th grade
   - 7th grade
   - 8th grade
   - 9th grade
   - 10th grade
   - 11th grade
   - 12th grade
   - Other (please specify): _____

5a. Do you have a computer that you can use outside of school?
- Yes
- No (skip to question 6a)

b. If Yes, do you use this computer to go on the Internet?
- Yes, with my parent's/guardian's/caregiver's permission
- Yes, whenever I want to
- No, I am not allowed to go on the Internet
- No, I do not have access to the Internet outside of school

6a. Do you have other Internet-accessible technology that you can use outside of school?
- Yes
- No (skip to question 7)

b. If Yes, please identify the type(s) of Internet-accessible technology you have outside of school (check all that apply).
- iPhone
- Android
- Other smartphone
- iPad
- Netbook
- iPod Touch
- Other (please specify):_____

7. Thinking back to last week: how many days did you do each of the following activities on the Internet OUTSIDE OF SCHOOL?
Scale: Never/I didn't do this, 1 day per week, 2 days per week, 3 days per week, 4 days per week, 5 days per week, 6 days per week, 7 days per week
a. Use email or text messaging
b. Use social networking sites like Facebook or MySpace (not including games)
c. Do homework (like writing a paper or making a PowerPoint presentation)
d. Research for school
e. Shop
f. Download or play music
g. Create a website or blog
h. Create or edit digital pictures or movies
i. Play online games

8. How do you usually learn how to do new things with technology? (choose the best (1) response)
- I never learn to do new things with technology
- From my teachers
- From family members (like a parent, guardian, brother, or sister)
- From my friends

- I teach myself
- Other (please specify):_____

9a. Do you use a computer or netbook at school every day?

- Yes
- No (skip to question 10)

b. Are you the only student who uses this computer or netbook?

- No
- Yes, and I leave it at school.
- Yes, and I take it home with me.

10. At school, where do you use these technology devices most for schoolwork?
Scale: I use this most in the classroom, I use this most in the library or media center, I use this most in the computer lab, I use this most somewhere else in the school, I don't use this at school.

- Desktop computers
- Laptops
- Netbooks
- iPads
- Digital projector
- Interactive White Boards (like SmartBoards and Promethean Boards)
- Student response systems (Clickers)
- Digital audio players (like iPod)
- Digital cameras
- Digital video recorders (such as Flip)
- Mobile multi-purpose tools (like iPod Touch, iPhone, Nintendo DS, cell phone)
- Sensors, probes, and/or loggers

11. Thinking back to your most recent full week of school: how many school days did you use each of the following technologies at school for schoolwork?
Scale: Never/I didn't do this, 1 day per week, 2 days per week, 3 days per week, 4 days per week, 5 days per week

- Desktop computers
- Laptops
- Netbooks
- iPads
- Digital projector
- Interactive White Boards (like SmartBoards and Promethean Boards)
- Student response systems (Clickers)
- Digital audio players (like iPod)
- Digital cameras
- Digital video recorders (such as Flip)
- Mobile multi-purpose tools (like iPod Touch, iPhone, Nintendo DS, cell phone)
- Sensors, probes, and/or loggers

12. Which of these technology devices do you and your teachers use in your classes?
Scale: Both my teacher and I use this, My teacher uses this but I don't, I use this but my teacher doesn't, both my teacher and I do NOT use this.

- Desktop computers
- Laptops
- Netbooks
- iPads
- Digital projector
- Interactive White Boards (like SmartBoards and Promethean Boards)
- Student response systems (Clickers)
- Digital audio players (like iPod)
- Digital cameras
- Digital video recorders (such as Flip)
- Mobile multi-purpose tools (like iPod Touch, iPhone, Nintendo DS, cell phone)
- Sensors, probes, and/or loggers

13a. How would you rate your overall ability to use technology?

- I never need help using technology.
- I rarely need help using technology.
- I sometimes need help using technology.
- I always need help using technology.

13b. When you use technology at school, check how much help you need with each of these things. (If you do not know what something is, check the "I don't know" box.)
Scale: Always need help, Sometimes need help, Rarely need help, Never need help, I have never used this at school, I don't know.

- Spreadsheet
- Database
- Word processor
- Internet browser
- Video Editor
- Photo Editor
- Music Storage (like iTunes)
- Graphic Organizer (like Inspiration)
- Presentation Program (like PowerPoint)
- Draw or paint software
- Games and simulation activities
- Keyboarding
- Computer-based/online tests
- Digital portfolios

13c. If you are using technology and it is not working, what do you do first?

- Try to fix it myself
- Ask an adult for help

- Ask a friend for help
- Give up and do something else
- Other (please specify): _____

Question 14 Scale: Always, Sometimes, Never, I don't know.

14a. Technology makes learning fun
14b. Technology makes it easier to learn new things
14c. I like using computers for schoolwork more than I like using pencil and paper.
14d. I enjoy being at school when I am using technology

END OF 4-6 SURVEY!
QUESTIONS 15-19 FOR GRADES 7-12 ONLY.

15. Thinking back to your most recent full week of school: how many school days did you use technology in each one of your core subjects:
Scale: Never / I didn't use technology in this subject, 1 day per week, 2 days per week, 3 days per week, 4 days per week, 5 days per week, I don't take this subject.

a. English, reading or language arts
b. World languages
c. The arts (theatre, visual, music, dance)
d. Math
e. History/Social studies
f. Science
g. Other
   If Other please specify:_____

16. Thinking back to your most recent full week of school: how many school days did you use technology to help you do the following activities in your classes at school:
Scale: Never, 1 day per week, 2 days per week, 3 days per week, 4 days per week, 5 days per week.

- Listening
- Completing worksheets
- Note taking
- Answering questions
- Participating in discussions
- Preparing and giving presentations
- Writing/Creating
- Completing a hands-on activity (like Lego Robotics)
- Creating and editing digital images
- Taking tests
- Spending free time
- Other
  If Other, please describe: _____

17. Thinking back to your most recent full week of school: how many school days did you use technology at school for schoolwork to:
Scale: Never, 1 day per week, 2 days per week, 3 days per week, 4 days per week, 5 days per week.

a. Create and edit papers in word processing software, such as Microsoft Word
b. Record data using software like Excel
c. Create graphs or tables to display data
d. Create presentations (using PowerPoint or SmartNotebook)
e. Organize ideas graphically using software like Inspiration
f. Organize and expand my digital portfolio
g. Communicate with teachers or other students about school work
h. Play educational games
i. Watch video clips online
j. Research a topic on the Internet
k. Create or update your own website or blog
l. Create files on the computer that include video, audio, or animation
m. Use software that prepares you for State or other standardized tests (like SAT prep)
n. Work collaboratively with other students to create products
o. Share digital files with people outside of your school and family
p. Communicate with experts (outside of your school and family) about topics related to your schoolwork

18. Please tell us how much you agree with each statement:
Scale: Strongly Agree, Agree, Neither agree nor disagree, Disagree, Strongly Disagree, I don't know.

a. I am more interested in my schoolwork when I use technology than when I use other tools.
b. I am more organized when I use technology than when I use other resources.
c. I enjoy participating in my classes when technology is used in the lessons.
d. I write more when I use technology than when I use paper and pencil.
e. I put forth my best effort at school when I am using technology.
f. At school I am encouraged to be creative when using technology.
g. It is easier for me to understand my schoolwork when I use technology than when I use other resources and tools.
h. I give up when schoolwork using technology is difficult.
i. I can figure out new technology quickly.
j. My typing skills slow me down when I work on a computer.
k. Learning about technology in school will benefit my future.

Question 19 Scale: Yes, No, I don't know

19a. I use the Internet safely.
19b. I follow copyright laws when using technology to complete assignments.
19c. Do you feel like you are prepared to deal with cyberbullying?

20a. Did you learn new technology skills as a result of having access to the new technology in your classroom?[73]

- Yes
- No (skip to question 21)
- I don't know (skip to question 21)

20b. If Yes, what skills did you learn and how have these new skills helped you? (both in school and outside of school)[74]

_____
_____
_____
_____
_____

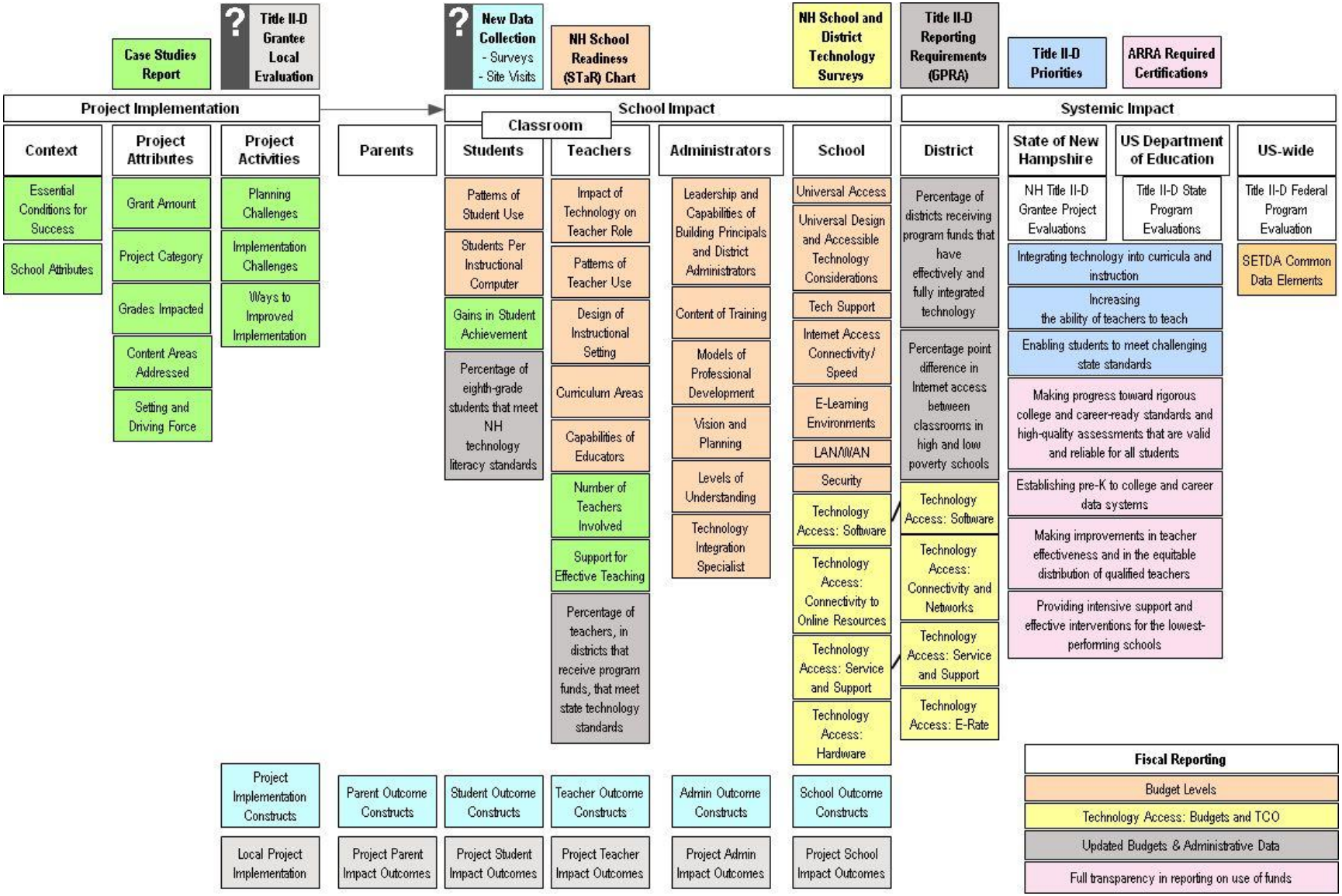
21. What was your favorite part about having access to new technology in your classroom?[75]

_____
_____
_____
_____
_____

[73] Appeared on the end of the year treatment survey only.
[74] Appeared on the end of the year treatment survey only.
[75] Appeared on the end of the year treatment survey only.

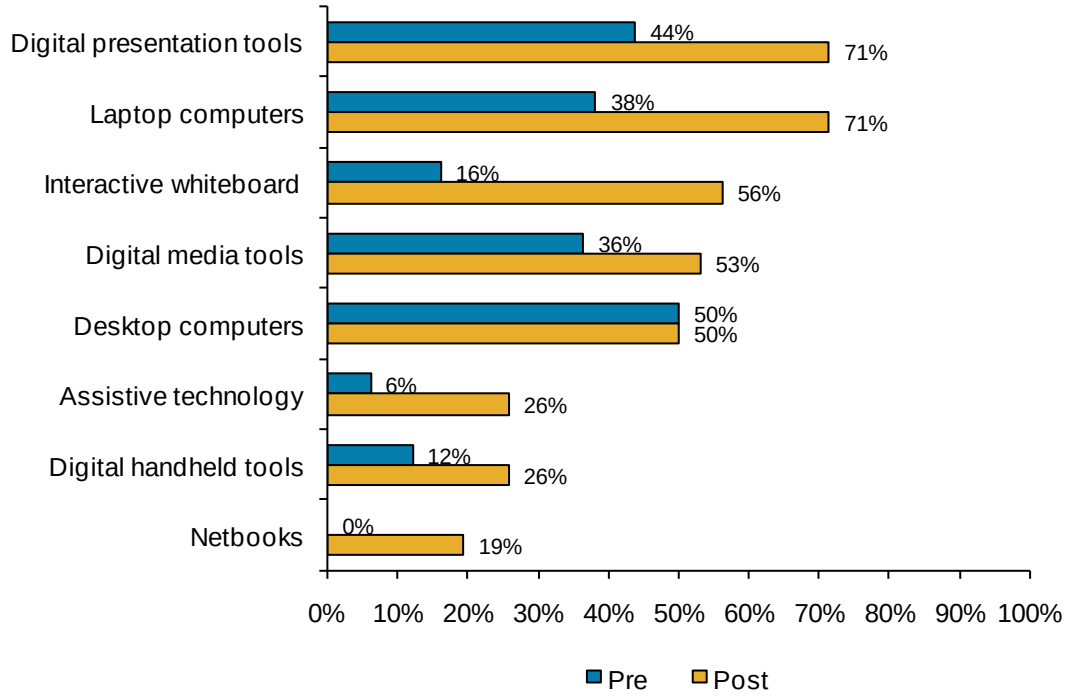
Appendix 5:
NH Title II-D Logic Model

Figure 76. NH Title II-D Logic Model



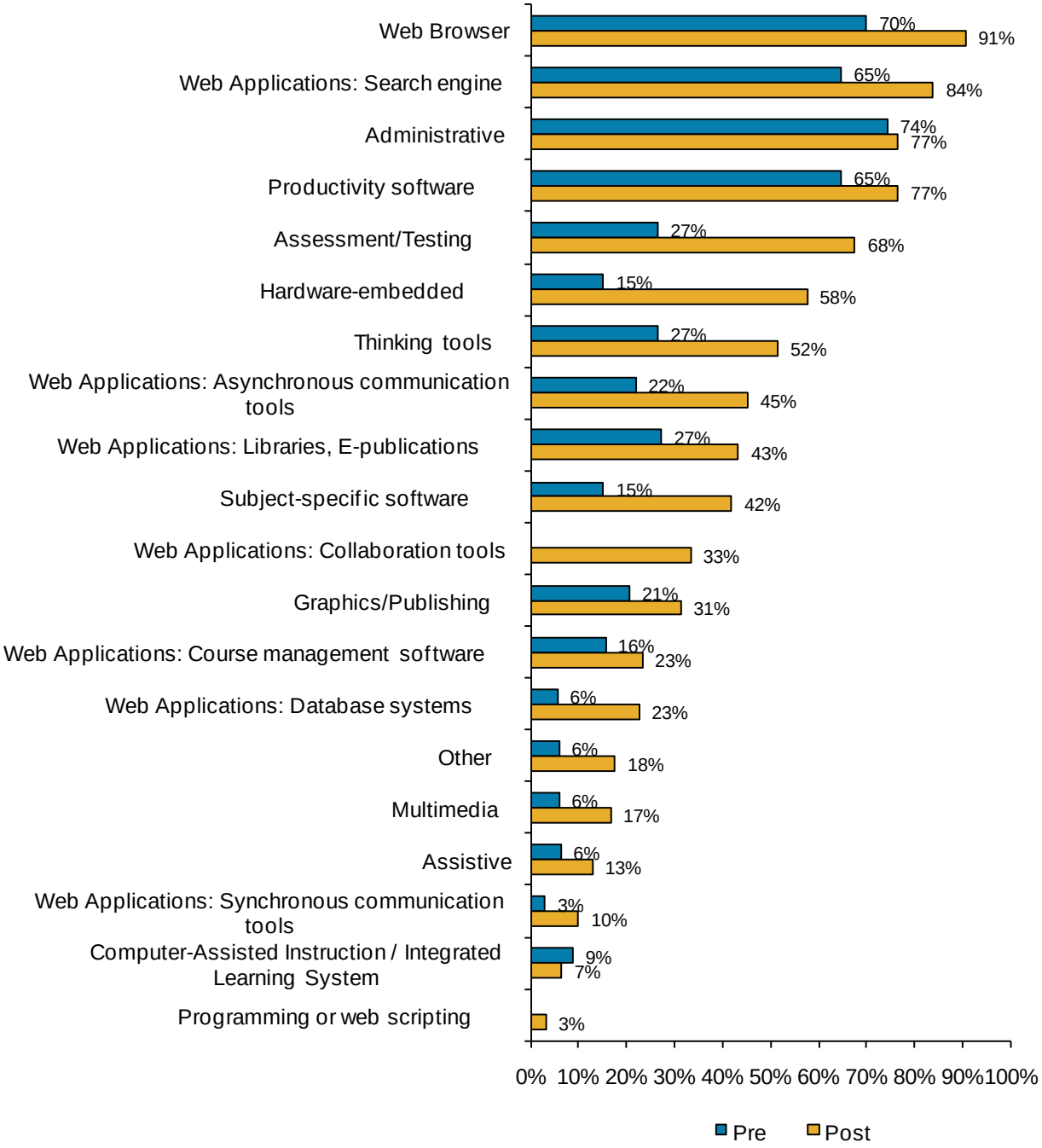
Appendix 6:
Tables of Findings

Figure 77. I design instruction that requires the use of these technologies by the teacher (control)*



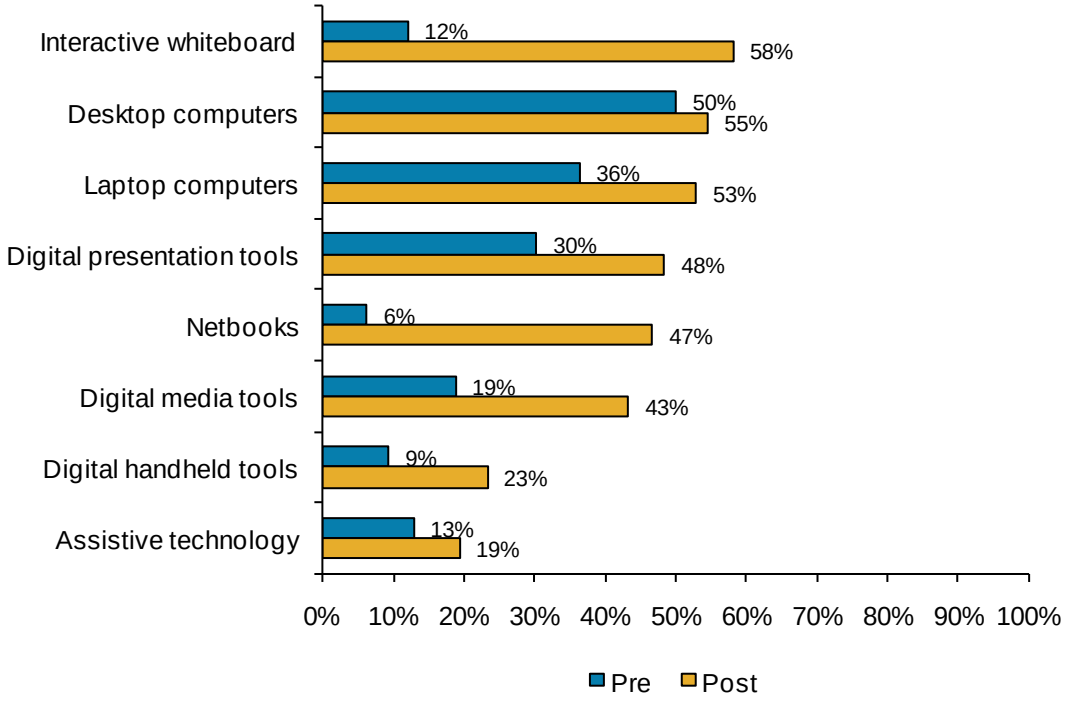
*The number of respondents ranged from 31 to 35 due to missing data.

Figure 78. What computer applications did you use in your instruction with students? (control).*



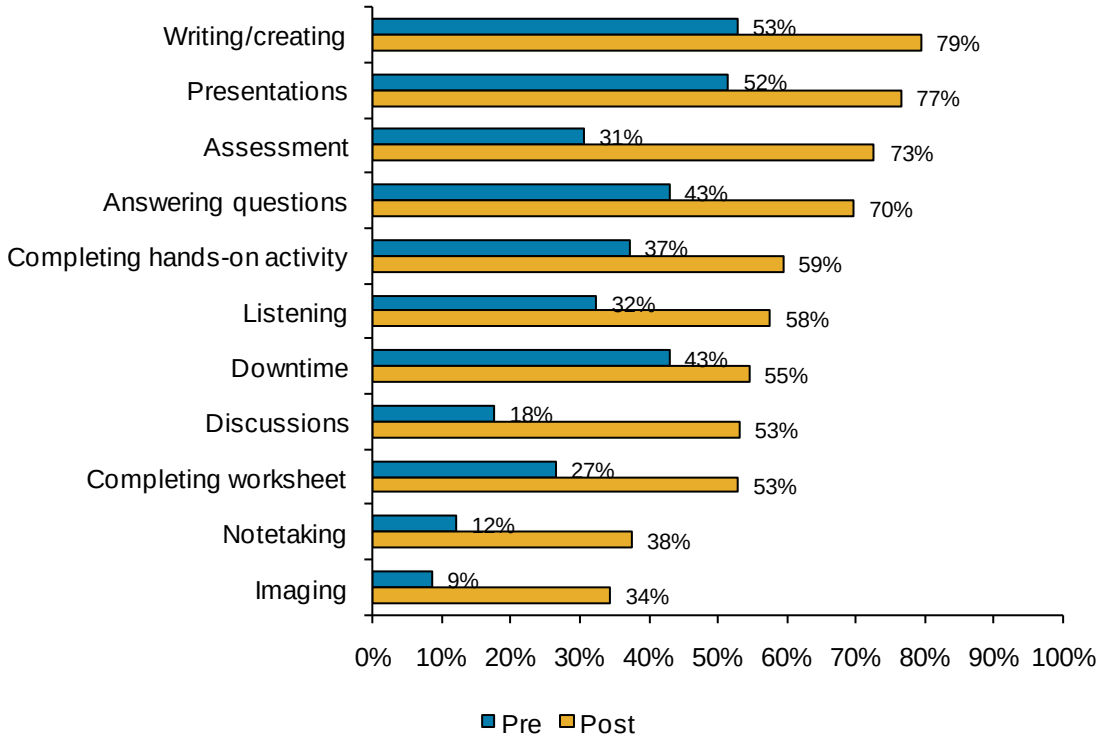
*The number of respondents ranged from 17 to 35 due to missing data.

Figure 79. I design instruction that requires the use of these technologies by the student (control)*



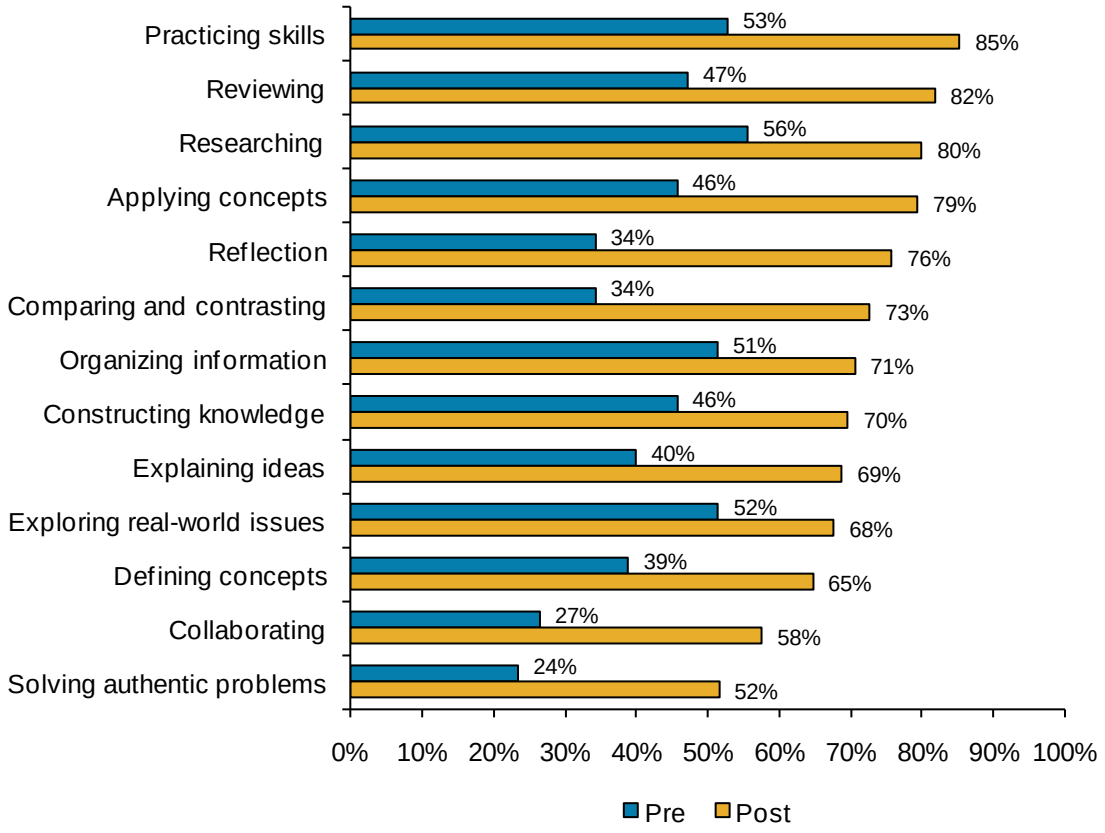
*The number of respondents ranged from 31 to 34 due to missing data.

Figure 80. For what activities did/do your students use technology? (control)



*The number of respondents ranged from 32 to 36 due to missing data.

Figure 81. For what purposes did/do your students use technology? (control)



*The number of respondents ranged from 31 to 36 due to missing data.

Table 24. Days per week students use technology at school for schoolwork (control)

Thinking back to your most recent *full week of school*: how many school days did you use each of the following technologies at school for schoolwork?:	Time of School Year	N	Average days per week	Change
Desktop computers*	Beginning	383	1.88	-0.17
	End	386	1.71	
Laptops	Beginning	385	1.33	0.09
	End	383	1.42	
Netbooks*	Beginning	382	1.19	-0.13
	End	378	1.06	
iPads	Beginning	380	0.26	0.01
	End	380	0.27	
Digital projector*	Beginning	377	2.46	-0.26
	End	381	2.20	
Interactive White Boards	Beginning	380	2.95	-0.39
	End	380	2.56	
Student response systems	Beginning	379	0.80	-0.38

	End	379	0.42	
Digital audio players	Beginning	381	0.67	-0.18
	End	379	0.49	
Digital cameras	Beginning	379	0.28	0.05
	End	383	0.33	
Digital video recorders	Beginning	380	0.28	-0.02
	End	383	0.26	
Mobile multi-purpose tools	Beginning	382	0.56	-0.1
	End	380	0.46	
Sensors, probes, and/or loggers	Beginning	376	0.32	-0.12
	End	379	0.20	

* Change for the treatment group is significantly greater than change for the control group (at $p<.05$).

Table 25. Days per week students use technology for specific activities (control)

Thinking back to your most recent *full week of school*: how many school days did you use technology to help you do the following activities in your classes at school:	Time of School Year	N	Average days per week	Change
Listening	Beginning	193	0.80	
	End	191	0.80	0.00
Completing worksheets	Beginning	191	1.42	
	End	192	1.08	-0.34
Note taking	Beginning	191	1.20	
	End	193	1.15	-0.05
Answering questions	Beginning	194	1.62	
	End	192	1.15	-0.47
Participating in discussions	Beginning	193	1.04	
	End	192	0.83	-0.21
Preparing and giving presentations	Beginning	194	1.25	
	End	191	1.27	0.02
Writing/Creating	Beginning	192	2.04	
	End	191	1.70	-0.34
Completing a hands-on activity (like Lego Robotics)	Beginning	193	0.57	
	End	192	0.60	0.03
Creating and editing digital images	Beginning	191	0.64	
	End	193	0.57	-0.07
Taking tests	Beginning	193	0.84	
	End	192	0.83	-0.01
Spending free time	Beginning	193	1.15	
	End	193	1.12	-0.03

Note: Change is *not* statistically significantly greater for the treatment group than the control group for any items.

Table 26. Days per week students use technology for specific tasks (control)

Thinking back to your most recent *full week of school*: how many school days did you use technology at school for schoolwork to:	Time of School Year	N	Average days per week	Change
Create and edit papers in word processing software, such as Microsoft Word	Beginning	194	2.04	-0.26
	End	193	1.78	
Record data using software like Excel	Beginning	193	0.89	-0.13
	End	194	0.76	
Create graphs or tables to display data	Beginning	192	0.84	-0.12
	End	191	0.72	
Create presentations (using PowerPoint or SmartNotebook)	Beginning	194	1.05	0.06
	End	194	1.11	
Organize ideas graphically using software like Inspiration	Beginning	195	0.47	0.11
	End	191	0.58	
Organize and expand my digital portfolio	Beginning	194	0.54	0.17
	End	193	0.71	
Communicate with teachers or other students about school work	Beginning	193	0.80	-0.17
	End	191	0.63	
Play educational games	Beginning	194	0.64	-0.01
	End	192	0.63	
Watch video clips online	Beginning	193	1.10	-0.13
	End	193	0.97	
Research a topic on the Internet	Beginning	194	1.23	0.27
	End	193	1.50	
Create or update your own website or blog	Beginning	195	0.28	0.17
	End	193	0.45	
Create files on the computer that include video, audio, or animation	Beginning	195	0.66	-0.11
	End	192	0.55	
Use software that prepares you for State or other standardized tests (like SAT prep)	Beginning	195	0.43	0.06
	End	193	0.49	
Work collaboratively with other students to create products	Beginning	195	0.73	-0.07
	End	189	0.66	
Share digital files with people outside of your school and family	Beginning	195	0.43	0.11
	End	191	0.54	
Communicate with experts (outside of your school and family) about topics related to your schoolwork	Beginning	189	0.38	0.09
	End	190	0.47	

Note: Change is *not* statistically significantly greater for the treatment group than the control group for any items.

Table 27. Days per week students use technology in core subjects (control)

Thinking back to your most recent *full week of school*: how many school days did you use each one of your core subjects?:	Time of School Year	N	Average days per week	Change
English, reading or language arts*	Beginning	196	2.65	-0.46
	End	195	2.19	
World languages	Beginning	194	2.03	-0.13
	End	195	1.90	
The arts (theatre, visual, music, dance)	Beginning	193	2.18	0.01

	End	193	2.19	
Math*	Beginning	193	1.54	0.24
	End	195	1.78	
History/Social studies	Beginning	194	1.93	-0.07
	End	193	1.86	
Science	Beginning	193	3.31	-0.23
	End	195	3.08	

* Change is statistically significantly greater for the treatment group than for the control group (at $p<.005$).
Note: "I do not take this subject" was also an option choice for this question; however, responses indicating this selection were removed from this analysis.

Figure 82. Students are motivated to complete tasks when using technology (control)

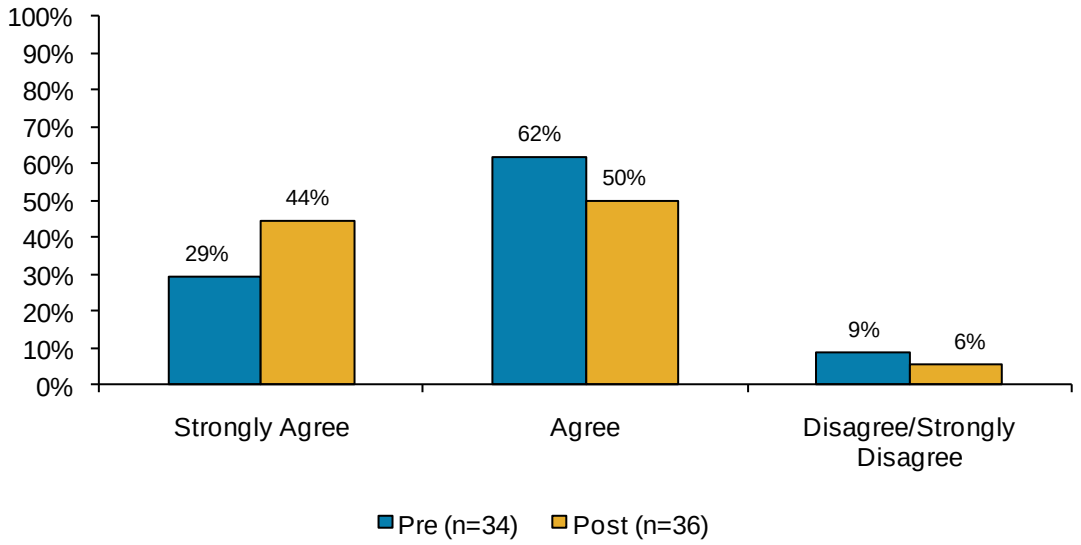


Figure 83. Students are on-task when using technology (control)

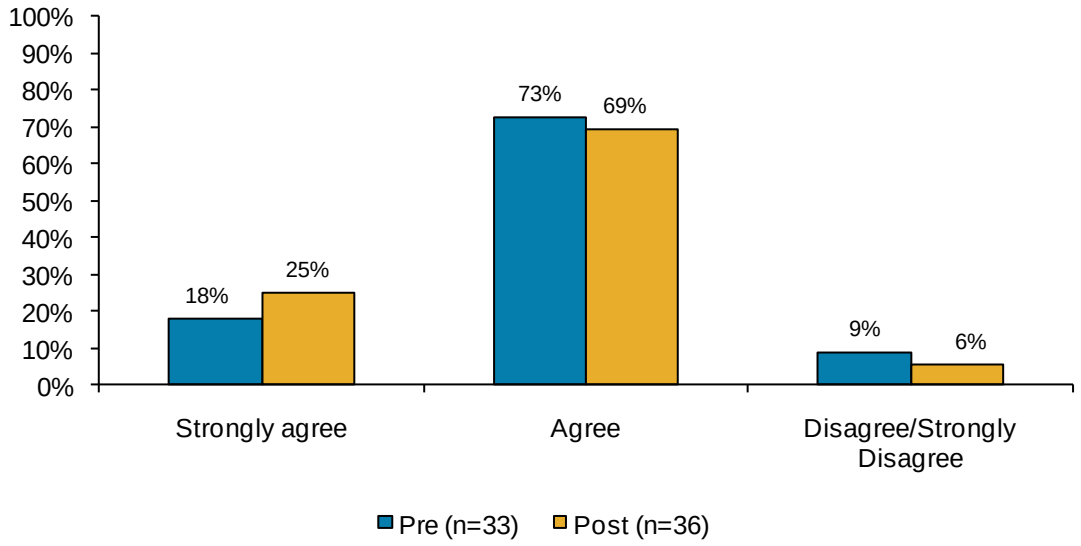


Figure 84. Students are engaged when using technology (treatment)

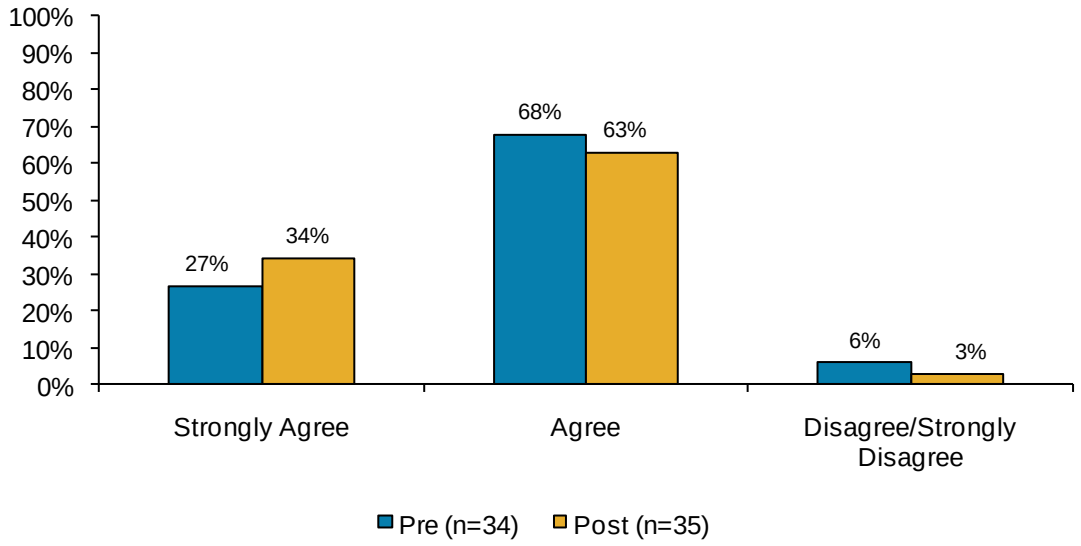
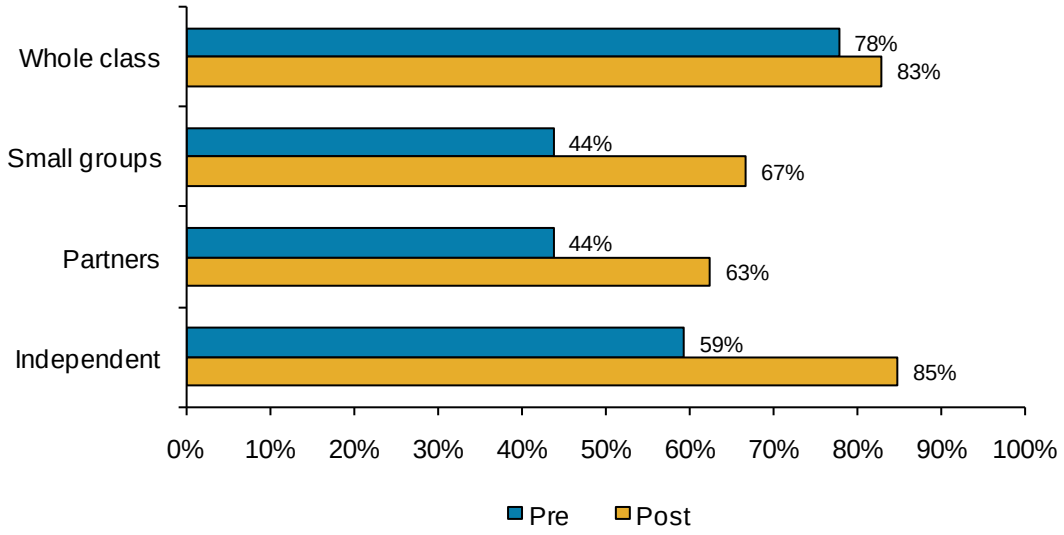


Figure 85. Student groupings present when using technology (control)*



*The number of respondents ranged from 32 to 36 due to missing data.

Table 28. ARRA School Classification (treatment)

SINI Schools (n=25)	Non-SINI Schools (n=17)
Allenstown Elementary School[1,2]	Alton Central School[2]
Armand R. DuPont School[1,2]	Epsom Central School[1,2]
Chester Academy[1,2]	Groveton Elementary[2]
Deerfield Community School[1,2]	Groveton Middle/High School[2]
Henry J. McLaughlin Middle School[1,2]	Jefferson Elementary School
Hillside Middle School	Josiah Bartlett Elementary School[1]
Lamprey River Elementary[1,2]	Lafayette Regional School[2]
Lancaster Elementary School	Mast Way Elementary School[1,2]
Maple Avenue Elementary[1,2]	Moharimet Elementary School[2]
Middle School at Parkside[1,2]	Nute Junior High School[2]
Milton Elementary School[2]	Oyster River High School[2]
New Searles Elementary School[1,2]	Pembroke Academy[1]
Nute High School[2]	Pembroke Hill School
Oyster River Middle School[1,2]	Pembroke Village School
Pittsfield Elementary School[1,2]	Pittsfield High School[2]
Pittsfield Middle School[2]	Profile High School[1,2]
Portsmouth Middle School[1,2]	Profile Junior High School
Somersworth Middle School[2]	
Southside Middle School[1,2]	
Three Rivers School[1,2]	
Timberlane Regional Middle School[1,2]	
Unity Elementary School[1,2]	
White Mountains Regional High School	
Whitefield Elementary School	
Woodland Heights School[1,2]	

[1] School participated in the Educator Survey
[2] School participated in the Student Survey

Figure 86. Staff participation in professional development or training for 2009-10 school year (treatment)

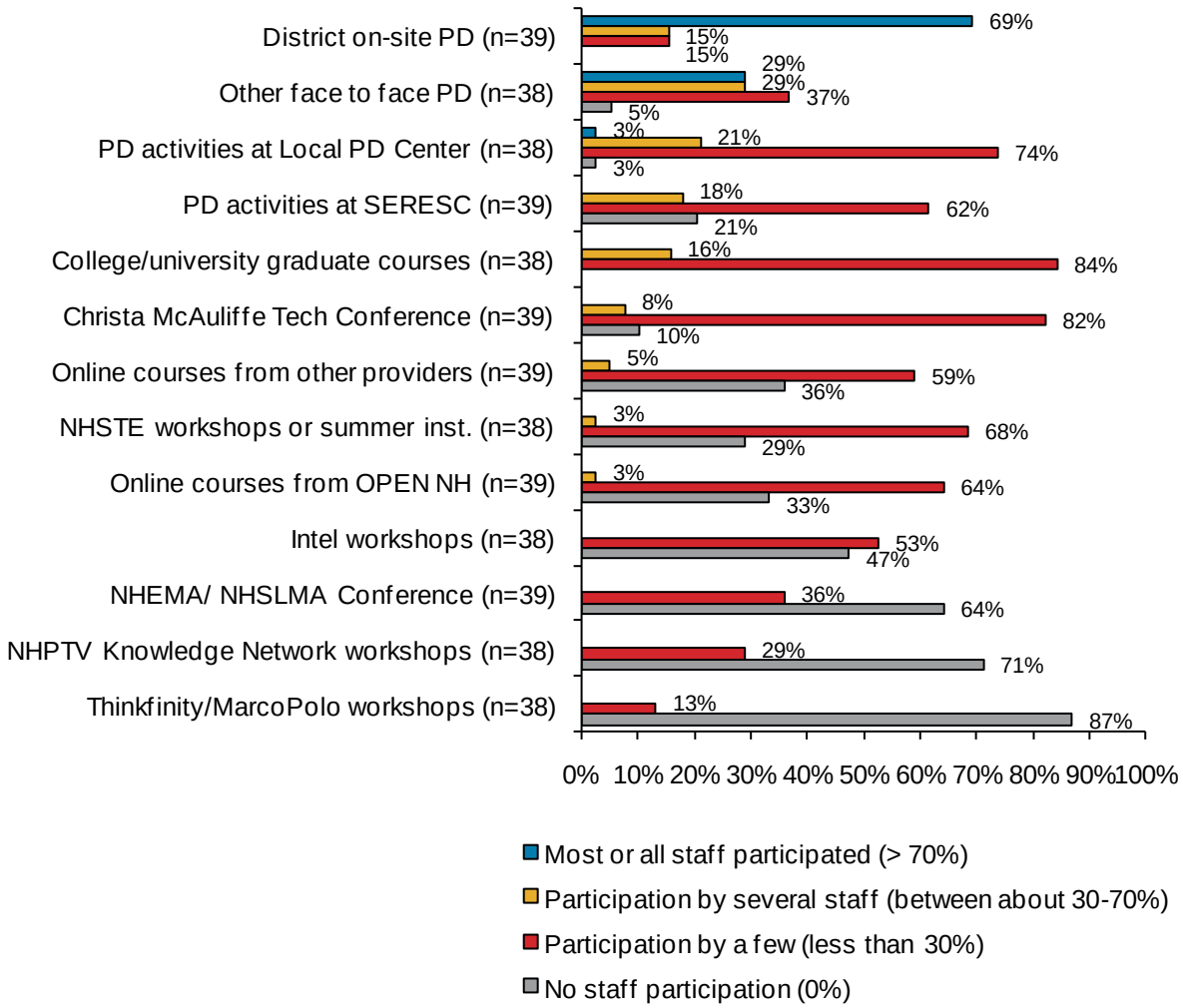


Figure 87. Teachers' need for professional development of technology topics (Spring 2010; treatment)

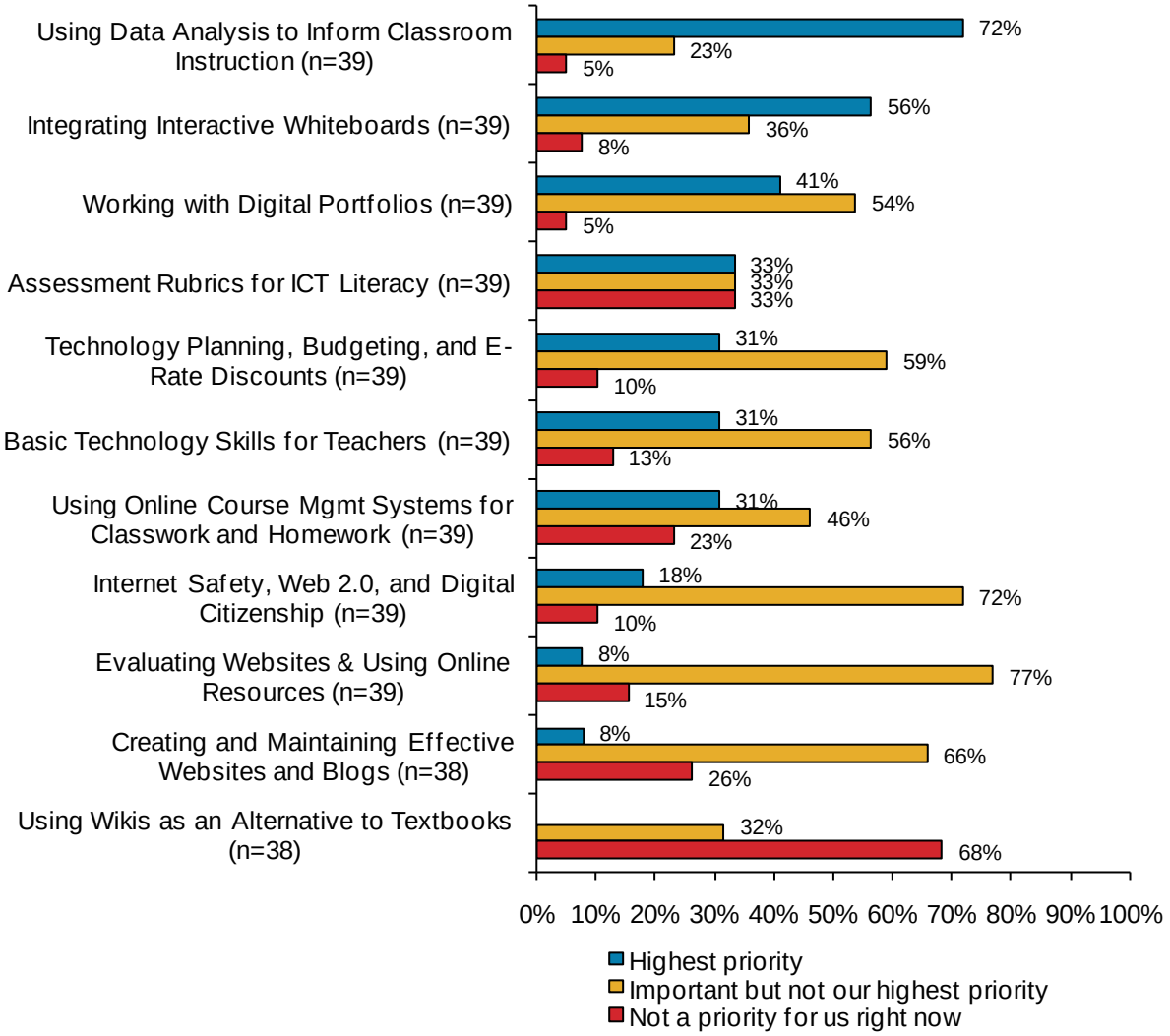


Figure 88. Teachers' need for professional development of non-technology topics (Spring 2010; treatment)

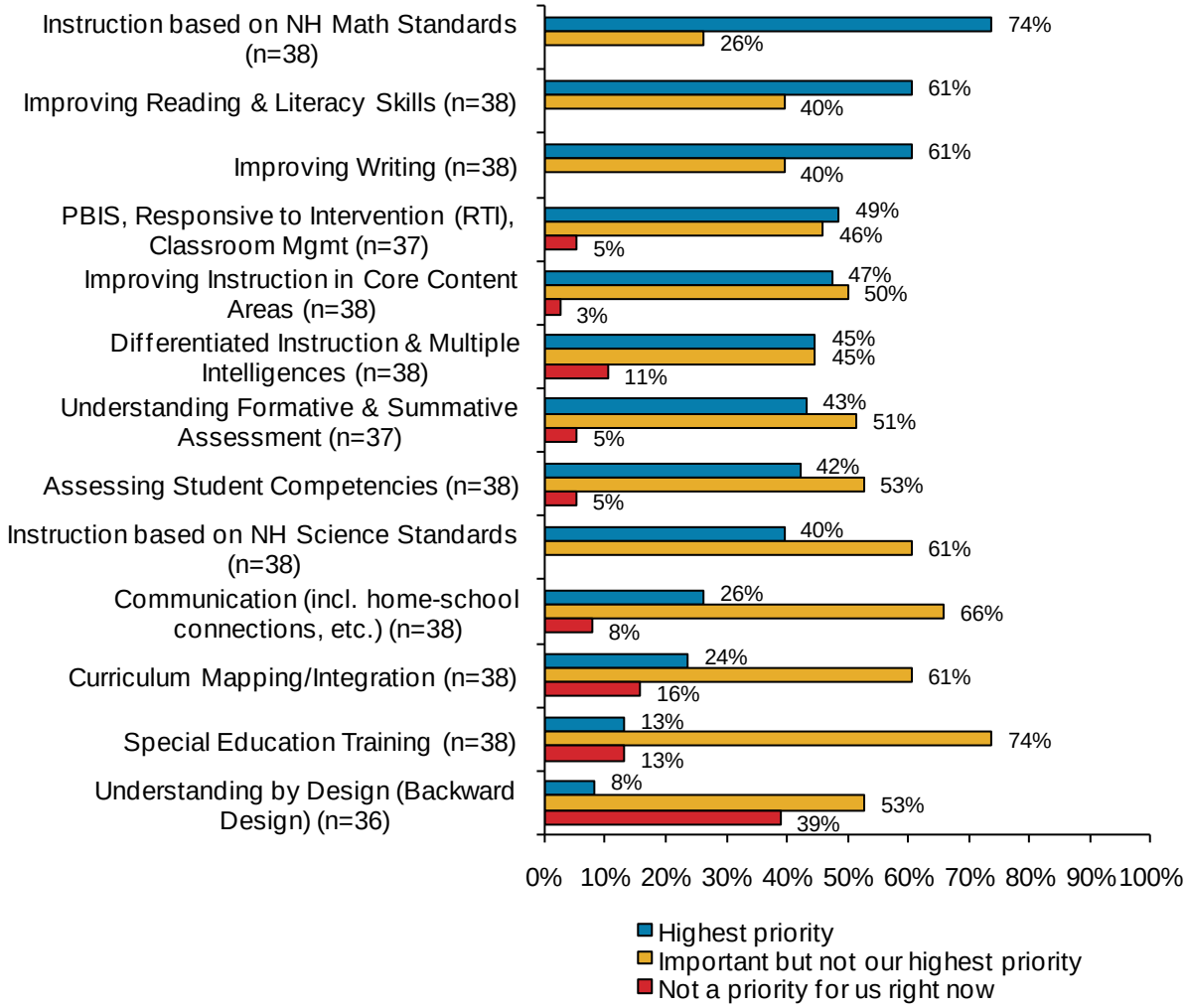


Figure 89. Teachers' need for professional development in NETS-T content areas (Spring 2010; treatment)

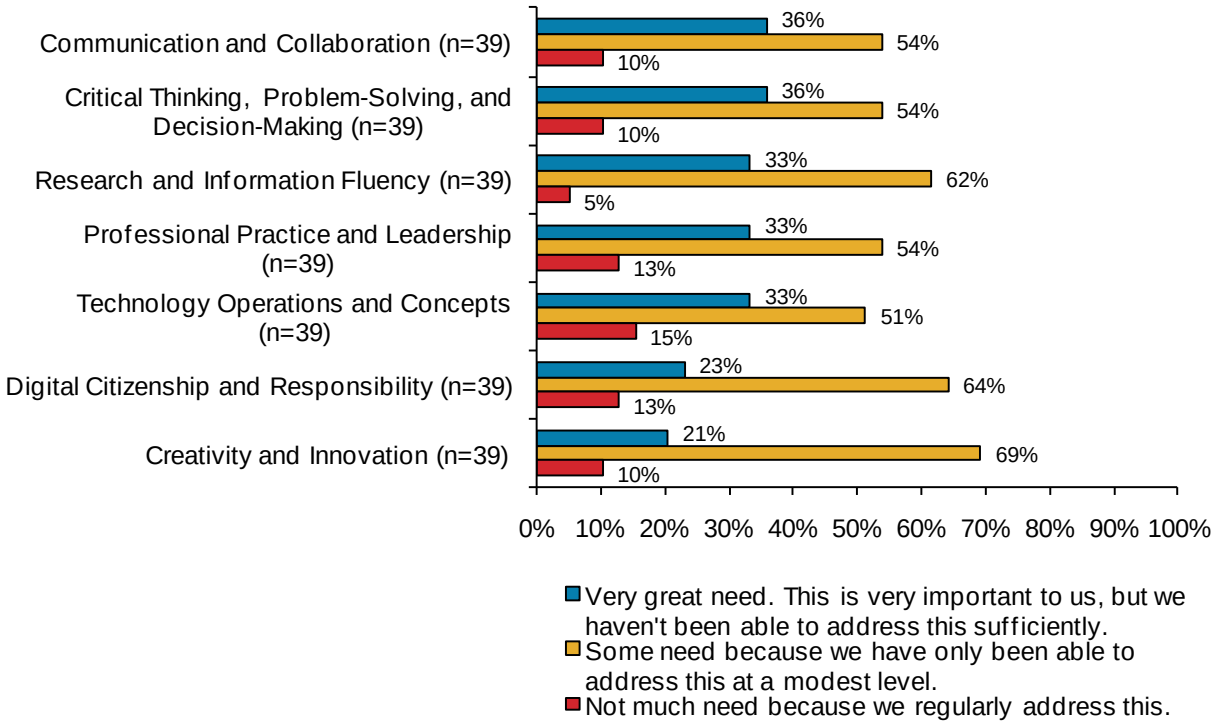


Table 29. Mini-Grant School Classification

SINI Schools (n=23)	Non-SINI Schools (n=17)
Amherst Middle School*	Alton Central School*
Barrington Middle School*	Ashland Elementary School*
Chester Academy	Belmont Elementary School*
Conant High School*	Campbell High School*
Epping Middle School	Garrison Elementary School*
Fall Mountain High School	Groveton High School*
Gilbert Hood Middle School	Hampstead Middle School*
Henry Wilson*	Jefferson Elementary School*
Iber Holmes Gove Middle School*	Josiah Bartlett Elementary School*
Inter-Lakes Elementary School*	Littleton High School*
Jonathan Daniels Elementary*	Milan Village School*
Lancaster Elementary School*	Oyster River High School*
Lebanon High School*	Pittsfield High School*
Maple Wood School*	Portsmouth High School*
Merrimack Valley Middle School*	Profile Junior High School
Mildred C. Lakeway Elementary School	Profile Senior High School
Pittsfield Middle School	Winnacunnet High School*
Pleasant Street School*	
Prospect Mountain High School*	

Rollinsford Grade School*	
Rundlett Middle School*	
West Running Brook Middle*	
Whitefield Elementary School	
Winnisquam Regional Middle School*	

*School participated in the Educator Survey

Table 30. TLC Recipient Classification

SINIs (n=27)	Non-SINIs (n=20)
Barrington Elementary School*	Alton Central School*
Bethlehem Elementary School	Atkinson Academy*
Charlestown Primary School*	Danville Elementary*
Chester Academy*	Groveton Elementary*
Deerfield Community School	Groveton High School*
Elm Street School*	Lisbon Regional Elementary School*
Fall Mountain High School*	Lisbon Regional High School
Farmington High School	Milan Village School*
Franklin Middle School*	North Charlestown Community School*
Gonic School*	Pembroke Academy*
Griffin Memorial*	Pittsfield High School*
Iber Holmes Gove Middle School*	Portsmouth High School*
Jonathan Daniels Elementary*	Profile Junior High School
Kearsarge High School*	Profile Senior High School*
Kennett Middle School	South Range Elementary School*
Lisbon Regional Middle School	Stark Village School*
Maple Wood School*	Stratford Public Elementary School*
Merrimack Valley Middle School	Stratford Public High School*
Mildred C. Lakeway Elementary School*	Vilas Elementary School*
New Franklin*	Walpole Primary School*
North Walpole Elementary School*	
Pittsfield Elementary School*	
Pittsfield Middle School	
Portsmouth Middle School*	
Rollinsford Grade School*	
White Mountains Regional High School*	
Winnisquam Regional Middle School*	

*School participated in the Educator Survey