

Discussion Paper: Laptop Program Implementation
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 February 2006

A. INTRODUCTION

The purpose of this paper is to look at some specific examples of laptop program implementation in larger middle and high schools. Five programs are included here: Irving School District in Texas; Henrico, County Georgia high schools; Canyon High School in Orange County, California; intermediate schools in Clovis, California; and middle schools throughout the State of Maine. All data reported is that which is publicly available through websites and/or published articles. Schools and districts were not contacted directly.

B. TEXAS TECHNOLOGY IMMERSION PROJECT (TIP)

1. Background & Funding

As a result of a legislative initiative, the State of Texas provided 7,300 students at 13 schools wireless laptop computers for use at home and at school for 2005/06 school year as a pilot project with a view to possibly expanding this program statewide. The project was funded with \$14.5 million from Federal Title II, part D (NCLB) federal technology funds. The project is identified as a collaborative public-private partnership. Corporate partners include Dell, AlphaSmart, Absolute Software, Blackboard, Questia & EdSoft. Funding was also provided for independent evaluations of TIP by the Texas Center for Education Research.

2. Irving Independent School District

One of the configurations eligible for implementation was a vertical team consisting of an elementary, middle and high school in the same enrollment area. Irving Independent School District is a large urban school district located in the Dallas/Fort Worth metropolitan area. They are participating in TIP as a vertical team consisting of an elementary, middle and high school feeder pattern with a total of 4,088 students and 315 teachers:

School:	Lively Elementary	DeZavala Middle	Irving High School
Grade Span	K-5	6-8	9-12
# Students	868	948	2272
Low income	75%	66.8%	53.8%
ELL	51%	17.9%	20.0%
Special Education	8.6%	9.2%	9.5%
Ethnicity:			
Caucasian	22.8%	25.9%	25.0%
Hispanic	69.8%	66.5%	60.6%

The three schools will share \$850,000 over a 2-year period to implement the program. Every student has a laptop: Dell for most and AlphaSmarts for the younger grades. All classrooms have a data projector, teacher laptop, printer and wireless access.

- Teachers have been involved in numerous staff development activities including:
 - Laptops 101
 - Levels of Technology Implementation (LoTI)
 - Integrating with AlphaSmarts
 - Classroom management
 - Job Alike sessions in content areas
- Parents and students are required to attend an orientation before receiving their laptops.
- Irving High School applications of the laptop technology include:
 - Online BlackBoard courses which post course information and assignments
 - Online textbooks
 - Questia online library
 - NetTrekker academic search engine
 - Turnitin plagiarism prevention
 - Video pep rallies
 - Online SAT prep courses
 - Videos on digital art
 - Posting student projects
 - For more detail see: www.irvingisd.net/tip/Irving/irvingHS.htm & www.irvingisd.net/ihtech/

3. Results of Laptop Immersion Program

In the spring of 2005, external evaluators conducted studies of teachers and students (6-12) regarding their perceptions, attitudes, prior use of computers, level of comfort, applications, and perceived outcomes regarding the laptop immersion implementation. Teacher responses, at the high school level were from all 4 high schools in the district that are implementing the laptop program – 410 teachers responded. At the elementary level, 61 teachers from Lively responded and at the middle level, 57 teachers from DeZavala Middle responded. Very detailed data is available in the report. Some highlights from the **high school teacher survey** include the following:

- Teachers report that students most often using laptops for:
 - Communicating with other students via email: 40.7% use it everyday
 - Accessing online databases/reference materials: 30.6% once/week
 - Projects involving critical thinking/problem solving skills: 26.7% once/week
 - Access online libraries: 23.0% once /week
- Teachers did not feel that students were carrying more responsibility for their learning more often with laptop use: 36.1% disagree/strongly disagree & 25.6% were undecided.

- 35.8% agree/strongly agreed students were mastering new skills better than students without laptops (37.3% undecided).
- Only 26.2% agree/strongly agreed that students were expressing themselves in writing better than non-laptop students (40.6% undecided).
- 68.4% did agree that students are finding out about ideas and information better.
- Only 34.5% believed that students were analyzing information better (38.3% undecided).
- 49.7% believe students are able to present information to an audience better with laptops.
- 41.9% believe students are learning to work independently better but only 33.9% believe students are learning to work collaboratively better.
- 91.4% of teachers note that their own computer skills have improved.
- 56.6% say that the curriculum in their classroom has changed.
- 55.4% say their role in the classroom has changed.
- 48.2% are using their computer for instructional purposes everyday & 30.2% are using it once/week.
- Only 26.5% say that student achievement in their classes has improved, 37% were undecided and 36.5% disagreed.

Although it is early in the implementation of this program, it is clear that the results are mixed in terms of positive outcomes for teachers and students. Subsequent studies may reduce the number of undecided responses as teachers have more experience with the program.

Selected results from **high school student surveys**:

- No significant differences were found between the attitude and skills of those in the TIP program versus their comparison group peers.
- Students' perceptions of main benefits of attending a school that has lots of technology: students learn more (53.1%), school is more fun (16.9%).
- Students believe access to technology is important to their education: 42.2% important & 47.9% very important.
- Main obstacles to using technology at school: slow access time to get on Internet (20.2%), school filters & firewalls (19.0%), computers don't work regularly (17.5%).

- Subject areas most effectively using technology: social studies/history (28.3%), science (18.6%) & English (18.5%).
- Students have used the internet for the following purposes:
 - Take a test online: 85.6%
 - Write a report using information from the internet: 79.4%
 - Go to websites set up for my school/class: 64.7%
 - Email a teacher: 57.6%
 - Use an online textbook: 49.1%
 - Use IM to talk to classmate about a class: 45.6%
 - Check on a class grade: 44.8%
 - Create a web page for a school project: 25%
 - Create a movie: 21.6%
 - Contribute to a web log: 20.5%
 - Take a class online: 13.6%
 - Get help from an online tutor: 14.8%.
- 65.7% of students are most likely to be using the computer for schoolwork at school with 24.2% using it at home.
- At school, 80.9% are using the laptops in the classroom.
- 63.6% consider themselves average tech users and 21.6% consider themselves advanced.
- Skill levels were not significantly different by gender; females and males were equally comfortable using computers. (researchers noted that this had changed from previous years when males rated higher on this attribute).
- No significant impact on attendance was found at TIP schools (attendance historically high >95%).
- Most positive measurable impact of the TIP program in the 1st year has been in the area of discipline: discipline referral rate at the TIP school was .21 versus .35 at the 2 comparison high schools.
- Did not examine academic performance data at the high school level as researchers felt that 2-3 years of technology-enhanced intervention would be required before impacts on standardized achievement test results would be seen.

Students at Irving High School appear to be more positive than the teachers about the value of the laptops in their education. As reported in a previous paper, one of the benefits of the use of technology is its positive impact on student engagement and motivation, which may ultimately lead to greater student achievement.

In looking at publicly available achievement data, Irving High School is not considered a high performing high school overall or in any individual subjects (www.just4kids.org). The strongest areas reported were in 9th grade reading and 10th grade language arts & science. Areas identified as most in need of attention were math 9th-11th grades, social studies 10th-11th grades & 11th grade language arts & science. Some sample data showing the performance of Irving High School to top performing schools in the state is included here:

SUBJECT/GRADE LEVEL	IRVING HIGH SCHOOL	TOP PERFORMING SCHOOLS
Grade 9 reading		
% proficient	25.3%	31.0%
% passing	80.8%	86.1%
Grade 10 language arts		
% proficient	15.5%	19.0%
% passing	72.5%	76.6%
Grade 9 mathematics		
% proficient	16.4%	29.2%
% passing	44.6%	67.6%
Grade 11 science		
% proficient	7.9%	15.0%
% passing	66.0%	77.9%

Source: www.just4kids.org

C. HENRICO COUNTY, GEORGIA

1. Background & Funding

The Henrico County School District in Virginia has 44,000 students in 65 schools. It is a diverse ethnic and socioeconomic population, which includes high-density urban areas, rural regions and high-tech suburban communities. More than 45% of the students are minorities.

In the 2002-2003 school year, Henrico County Public Schools launched the second phase of its Teaching and Learning Initiative. This is reported as the largest district-wide technology implementation in the nation. They have provided wireless laptop computers to every middle and high school student and teacher in the public school district. The program began with phase I, where 12,000 laptops were distributed to middle and high school teachers and to all high school students. The second phase, involved an additional 13,000 middle school students.

The District Superintendent noted that one of the reasons for the implementation of the program was the serious digital divide in the county, with hundreds of families with no access to technology at home. In addition, they felt they needed a device that would radically change their teaching model, from a traditional teacher-centered approach to an engaged, interactive, constructivist model. They believed that the use of the laptops would yield the highest level of academic achievement.

The iBooks were acquired through a four-year \$18.6 million lease for grades 7-12. An additional \$3.1 million lease for 6th grade is now in place as well. The funds for this program were allocated from the school district's operating budget as well as state and federal technology funds. District officials point out potential costs savings due to the fact that they were able to convert former computer labs back into classrooms and no longer need to purchase furniture for desktop computers and are saving on electricity and networking costs.

Parents are asked to pay \$50 per year for insurance to cover loss, theft and damage to the laptops. At the end of four years, students will have the option to purchase the computers at a reduced cost. If families did not have Internet access at home, they were offered the option to purchase it through the school's provider at a rate of \$9.95/month. Families unable to pay these fees were provided assistance.

2. Training & Technical Support

The School District allocated funds for a full-time technical trainer and a computer technician in every middle and high school. In addition, each school also offers a help desk manned by students, under the supervision of a faculty advisor. These students diagnose and resolve hardware and software issues in many cases. This has helped to keep tech support costs down. The students earn community service credits for their work.

There was recognition in Henrico County schools that training teachers and students must continue to take place throughout the year. Middle school students were initially trained in laptop use during their P.E. classes. Students were trained on computer usage as well as code of conduct. Parents are also required to participate in a 90-minute orientation session, offered through parent resource centers, adult-learning centers, on videos and community access TV.

Apple offered initial training for teachers and administrators. It included a three-hour hands-on session on the use of the iBook computers, the MAC operating system, and on iMovie. The District offers a variety of teacher in-service opportunities throughout the school year. Technology trainers at each school support teacher development, conduct course-modeling workshops, co-teach classes, and assist in planning. Summer institutes are also held to help teachers learn how to create digitized content and Internet-based lessons. The District staff also maintains an array of education resources and best practices.

3. Applications

Teachers are using K12 Planet to post student grades, homework assignments and activities. Parents are reporting that they believe this is allowing them to stay more closely involved in their children's progress in school.

Teachers are using iMovie, AppleWorks, Beyond Books, Geometer's Sketchpad and other programs to create digital content and lesson plans. All content is stored via Virtual Share, a password-protected intranet accessible by all students and teachers in the county.

A math teacher at Hermitage High School felt that students had difficulty understanding geometric constructions. He created a movie starring a compass and a straightedge for his class. It was well received by students and he has since created an additional five videos on various geometric constructions. These are accessible to students anytime, so that they can view them more than once if they are having difficulty with the concept.

Students are creating multimedia research projects using tools such as iMovie, iTunes, & iPhoto. They are creating sophisticated PowerPoint presentations using video clips, still photos and music.

Instead of providing students with a science textbook, the laptop gives students access to an entire science lab with virtual lab simulations and thousands of resources in a cost-efficient manner.

For additional examples of the online resources available in Henrico County, see <http://teachers.henrico.k12.va.us/elearning/>.

4. Outcomes

It does not appear that any independent evaluations of the impact of the laptop program in Henrico County have been conducted. However, websites do report on responses from teachers, students and parents as well as some district-wide achievement data:

- Parents say that students are improving their organizational skills with the laptops.
- The District Superintendent suggested that the laptops are bridging learning between the classroom and home – “learning doesn’t stop just because the teacher’s not around...”
- A 2003 survey of parents found that 94% of parents were satisfied with their student’s education; an increase of 6% from previous parent surveys in the County.
- Parents are happy with the opportunity to check grades and communicate with teachers online.
- Teachers note that learning is now more of a team effort, with kids teaching teachers, teachers teaching kids, and kids teaching each other and that students are excited and engaged as never before.
- Others suggest that students are in control of their own learning, have a much deeper level of understanding and are more engaged.
- Teachers report that students have come to regard their laptops as one item they absolutely cannot be without.

- In the past Henrico's high school students have scored lowest on standardized testing in the subject area of U.S. history. Teachers elected to create their first digital content in that subject. They used the course for one year and report that students' scores went up considerably from 74% of students meeting standards in 2001 to 86% in 2002 and 91% in 2003 in Social Studies.
- Boosts in academic achievement in English were also reported, after the teachers provided a lot of digital content in this area. Students' meeting standards went from 90% in 2001 to 95.5% in 2003.
- The number of students scoring proficient in Mathematics went from 84% to 90% in the 3-year period and in Science from 85% to 93%.
- They report that after only one year with the initiative, their high school students scored the highest of all the schools in the neighboring districts on all 11 standardized tests. They believe the laptop program has had an impact on this increase in student performance.
- The District went from 78% fully accredited high schools to 100% in the 3-year period.
- They note that even in schools with the highest level of diversity and lowest economic means, attendance is up, dropout rate is at an all-time low, and test scores have shown an impressive increase.
- Overall, dropout rate is down to 1.52%.
- District officials have stated that the laptops are especially helpful for learning-disadvantaged students. Students who have had difficulty taking notes during class can now download the day's lesson and/or tutorial to review the material more easily. Students who struggled with receiving their lessons auditorily, now can receive them visually and graphically as well.
- A student reports that using the SAT study program available on his laptop helped to raise his SAT score by 100 points.
- Another measure of gains in student achievement has been identified in terms of the scholarships earned by graduating seniors: in 2002 students were offered \$12.4 million in scholarships; in 2003, that figure rose to \$17 million.

5. High Schools in Henrico County

The nine high schools in Henrico County offer one or more magnet or specialty programs. Four high schools have been chosen for illustration purposes. All of these are fairly large schools serving 9-12th grades, are fully accredited in 2004/05. Data is shown overall & for specific subgroups (when available):

SCHOOL	GODWIN HIGH	DEEP RUN HIGH	HENRICO HIGH	VARINA HIGH
# Students	1966	1614	1705	1862
Specialty program(s)	Center for Science, Math & Technology	Center for Information Technology	Center for the Arts; & IB program	Center for Communication
Made AYP in 2004/05	Yes	Yes	No	No
% students passing English standardized test	97% overall 79% for disabled 89% black	98% overall 94% disabled 95% black	88% overall 70% disabled 85% black	88% overall 65% disabled 88% black
% students passing math standardized tests	97% overall 90% black 95% Hispanic 91% disabled 96% limited Engl.	96% overall 88% black 80% Hispanic 83% disabled 100% limited Eng	82% overall 79% black 92% Hispanic 53% disabled	82% overall 81% black 69% disabled
% students passing science standardized tests	95% overall 82% black 81% Hispanic 79% disabled 70% limited Engl.	98% overall 92% black 94% Hispanic 87% disabled 73% limited Engl.	86% overall 83% black 93% Hispanic 52% disabled 89% limited Engl.	85% overall 82% black 100% Hispanic 60% disabled 100% limited Engl.
Attendance rate	96%	97%	93%	93%
Graduation rate	96%	67%	83%	81%

School websites for further information:

- Godwin: www.henrico.k12.va.us/hs/godwin
- Deep Run: www.henrico.k12.va.us/hs/deeprun
- Henrico: www.henrico.k12.va.us/hs/henrico
- Varina: www.henrico.k12.va.us/hs/varinahs

Accountability data for all Virginia schools: <http://www.pen.k12.va.us/VDOE/src/vasrc-reportcard-intropage.shtml>.

D. ORANGE COUNTY, CALIFORNIA LAPTOP PROGRAM

Orange County Unified School District appears to offer laptop programs at three of its high schools: Villa Park, Canyon, & El Modena. One of these is illustrated below.

1. Canyon High School, Anaheim, California www.orangeusd.k12.ca.us/canyon/

Profile:

- Serving 2,100 students 9th-12th grades
- 60% white, 21% Asian, 11% Hispanic
- Offer both IB and AP classes (total of 15 courses offered)
- ROP classes available on campus: Advanced Auto, Desktop Publishing, Health Careers, Media Technology, & Web Page Design
- AVID program
- Operate on a block schedule where students attend 3 classes each day plus an optional tutorial daily
- Average class sizes in 2003:
 - English 22.78
 - Math 33.33
 - Science 31.67
 - Social sciences 36.92
- Counseling services: 5 FTE for a ratio of 1:403 students plus a college/career specialist

Technology:

- Technology-enhanced library/media center
- 4 specialized computer labs
- 5 portable wireless laptop carts
- Over 400 PC & MAC computers
- State-of-the-art video production lab
- Variety of laptop classes offered:
 - 9th & 12th grade eEnglish laptop courses
 - Integrated eEnglish/eHistory is offered at 10th & 11th grades
 - CyberCivics is an online government course for 12th grade students
 - ScienceNet program offers options in Engineering/Technology, Medical, and Communications sciences

School level achievement data:

- API score has increased from 738 in 2002 to 816 in 2005.
- The school met its 2005 growth target overall and for all subgroups.
- API statewide rank for 2004 is 10 out of 10.
- API similar schools rank for 2004 is 4 out of 10.

Sample California Standards Tests (CST) results (% of students meeting or exceeding standards):

SUBJECT	2004	2005
9 th Grade English Language Arts	68%	67%
9 th Grade Geometry	86%	90%
10 th Grade English Language Arts	64%	69%
11 th Grade English Language Arts	59%	59%

California High School Exit Exam Results (% passed):

SUBJECT	2003	2004	2005
English Language Arts	89%	91%	89%
Math	71%	90%	89%

Other data:

- Graduation rates of 96% in 2000 to 97.7% in 2002
- 37.2% of students completed all courses required for CSU/UC admission in 2003
- Average verbal SAT score in 2003: 535 & math 566 with 52.5% of students taking tests
- Rate of suspensions 3.6% in 2001 to 4.3% in 2003
- Rate of expulsions 0.2% in 2001 to 0.0% in 2003

E. CLOVIS UNIFIED SCHOOL DISTRICT AAAL PROGRAM

www.clovisusd.k12.ca.us

1. Background

The vision of the AAAL program in the Clovis Unified School District (Clovis, CA) is to have **any student** in grades 7-12 using a computer **anytime** they need to and **anywhere** they are. At the present time, four intermediate schools (7th-8th grade) are involved in the laptop program: Alta Sierra, Clark, Kastner & Reyburn. In addition, 8-10 elementary schools are offering the program to their 6th grade students.

The AAAL program uses a laptop immersion approach. A variety of options are being used to facilitate this, including:

- Loaning computers to selected students to take back and forth from school to home during the school year.
- In-class loaner program where district-owned laptops are kept in selected classrooms for the year & students use their own computers at home.
- Rotating sets of classroom computers to different classrooms for the students to use.
- Families are offered the option of purchasing a laptop for their student's use.

2. Reported Outcomes

The Clovis Unified School District believes that access to laptops benefit students:

- Enables teachers to more effectively improve students' critical thinking skills.
- Allows students to explore topics in a deeper, more meaningful way.
- Students are engaged, motivated and ready to learn.
- Increases collaboration between teachers and students.
- Individualized learning paths are enabled as students can learn at a pace and in a way that works best for them.
- Teachers report previously unsuccessful students blossom as the laptop re-engages them with learning.
- In 2001/02, laptop students showed higher performance on the SAT9 test compared to non-laptop students.

F. STATE OF MAINE LEARNING TECHNOLOGY INITIATIVE www.maine.gov/mlte/about/index.htm

In 1999/00, a one-time state surplus enabled Maine to announce plans to equip all of its middle school students and teachers with a personal learning device. In late 2001, they began the implementation of the Maine Learning Technology Initiative (www.mainelearns.org) by providing laptop computers to all 7th & 8th grade students and teachers. The plan was to evaluate the results and then consider expanding the program to other grade levels.

In February 2004, the Maine Education Policy Research Institute released a report on the impact of Maine's one-to-one laptop program on middle school teachers and students. Highlights of the reported results include the following:

- Teachers are using the laptops most often in developing instructional materials, conducting research related to instruction, and communicating with colleagues.
- Students report using the laptops most frequently in finding information (90%), organizing information (63%) and taking class notes (57%).
- Over 70% of the teachers surveyed reported that the laptops helped them to more effectively meet their curriculum goals & individualize their curriculum to meet individual student needs.

- More than 4 out of 5 teachers reported that students are more engaged in their learning, more actively involved in their own learning and produce better quality work.
- More than 70% of the students reported that the laptops helped them to be better organized, to get their work done more quickly, and with better quality.
- Teachers reported that at-risk and special needs children are particularly engaged in their learning.
- A sample of 9th grade students who no longer have laptops reported that they get less work done and the quality of their work has declined without the laptops.
- Teachers and principals report that laptops have had a positive impact on student attendance, behavior and achievement although concrete evidence is still sparse.
- Greatest obstacles reported by teachers in integrating the laptops into their curriculum and instruction were lack of technical support; lack of professional development opportunities; and the lack of time.

The researchers conclude that a large majority of Maine's middle schools have successfully implemented the one-to-one laptop program, and there is substantial self-reported evidence that student learning has increased and improved.

The only readily available research on high school implementation in Maine is one very small high school, so that data is not included here.

RESOURCES

Apple Computers, "Profiles in Success: Henrico County Public Schools"

www.apple.com/education/profiles/henrico1 &
www.apple.com/education/profiles/henrico2

Christensen, R. & G. Knezek, "Findings from the Spring 2005 Irving Laptop Surveys for Teachers" www.iittl.unt.edu/irving/IrvingTeacherReport2005.pdf

Christensen, R. & G. Knezek, "Student Findings from the Spring 2005 Irving Laptop Survey" www.iittl.unt.edu/irving/IrvingStudentReport2005.pdf

Clovis Unified School District, "About AAAL"

www.clovisusd.k12.ca.us/programs/curric/aaal_vision.html

Irving Independent School District, "Technology Immersion Pilot (TIP)" www.irvingisd.net/tip/
Orange County Unified School District, "OUSD Laptop Immersion Program"

www.orangeusd.k12.ca.us/edtech/laptop

Silvernail, D.L. & D.M. Lane, "The Impact of Maine's One-to-One Laptop Program on Middle School Teachers and Students" Phase 1 Summary Evidence. Maine Education Policy Research Institute. February 2004. <http://www.usm.maine.edu/cepare/mlti.htm>

State of Maine, "Maine Learning Technology Initiative" www.maine.gov/mlte/

Texas Education Agency, "Technology Immersion Project brings laptops to thousands of Texas students" Press Release June 3, 2004. www.tea.state.tx.us/press/techimmersion.html

Texas Technology Immersion Project: www.txtip.info/

Links to additional resources on laptop programs available at

www.apple.com/education/mobilecomputing/research.html