

Student Findings from the Spring 2005 Irving Laptop Survey¹

Introduction

This report contains findings for one of four components² of the Irving Independent School District (ISD) spring 2005 initiative to gather information that would aid in the refinement of the integration of laptops into the curriculum. Findings in this report are based on surveys completed by 3589 Grade 6-12 students from the four Irving high schools, a TIP project treatment middle school and a comparison middle school.

Background Information on Subjects

As shown in Tables 1-5, the 3589 students completing surveys for this study represented Grades 6-12 and predominately represented ages 11-18. Slightly more respondents were female (52.9%) than male (47.1%). Predominate ethnic identification areas for the respondents were Hispanic (46.9%) and White (27.2%). Representation was from the four high schools, a TIP treatment middle school and a comparison middle school. Each of the high schools has been in the laptop project for at least two years. The 2004-2005 school year was the first year of one-to-one implementation for DeZavala Middle School, the TIP treatment school.

Table 1.

Percentage of Participating Students by Grade, 2005

Grade Level	Frequency	Percent
6	381	10.6
7	356	9.9
8	314	8.7
9	911	25.4
10	688	19.2
11	556	15.5
12	381	10.6
Total	3589	100.0

Table 2.

Percentage of Participating Students by Age, 2005

Age	Frequency	Percent
11	135	3.8
12	336	9.4
13	339	9.4
14	522	14.5

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² The other major components are findings from teacher surveys; findings from focus group interviews with school personnel; and classroom observations, findings for each of which are contained in separate reports.

15	770	21.5
16	646	18.0
17	550	15.3
18	237	6.6
19	38	1.1
20	12	.3
Total	3589	100.0

Table 3.
Percentage of Participating Students by Gender, 2005

Gender	Frequency	Percent
Male	1691	47.1
Female	1898	52.9
Total	3589	100.0

Table 4.
What is your racial or ethnic identification?

Ethnicity	Frequency	Percent
Hispanic, Latino, or Spanish origin	1685	46.9
American Indian or other Native American	63	1.8
Asian American or Pacific Islander	162	4.5
Black/African American	339	9.4
White	978	27.2
Other	189	5.3
Did Not Respond	173	4.8
Total	3589	100.0

Table 5.
Percentage of Participating Students by School

School	Frequency	Percent
Comparison - Middle School	322	9.0
DeZavala (Treatment) Middle School	731	20.4
Irving HS	682	19.0
MacArthur HS	1008	28.1
Nimitz HS	307	8.6
The Academy of Irving	539	15.0
Total	3589	100.0

Measurement Indices

Online surveys gathering attitudes toward computers and learning dispositions, levels of technology proficiency and use, and specific perceptions of the laptop computer program

related to many areas of education and society, were administered to the students during May 2005. The primary instrument was the Computer Attitude Questionnaire (CAQ), whose core is a Likert scale of 80 items with five multiple choice responses ranging from 1 = strongly disagree to 5 = strongly agree (Knezek & Christensen, 1995). Additional scales were utilized for the Laptop Project evaluation, including standard comparison items from the Technology Proficiency Self Assessment (Ropp, 1999), individual skill items in selected technology areas, and customized items produced by the consultants in conjunction with the Irving ISD school leadership to assess perceived impact of the initiative and compare student perceptions to those of their teachers.

Instrument Reliability. An analysis of the reliability (measurement consistency) of the CAQ was carried out in 2000, using subjects similar to those at Irving ISD, from a public school district of comparable size in the Dallas – Ft. Worth metropolitan area (Knezek & Christensen, 2000). Internal consistency reliability indices (Cronbach's Alpha) ranged from $r=.75$ to $r=.91$ for the 14 scales and subscales examined. According to the guidelines provided by DeVellis (1991, p. 85), these fall in the range of "respectable" to "excellent (shortening scale would be acceptable) ":

DeVellis Reliability Guidelines

Below .60	Unacceptable
Between .60 and .65	Undesirable
Between .65 and .70	Minimally acceptable
Between .70 and .80	Respectable
Between .80 and .90	Very good
Much above .90	Consider shortening the scale

Analyses of the CAQ data gathered from Irving ISD in 2004 indicates the measurement properties of the scales are comparable for the set of data contained in this report.

Laptop and Related Computer Usage for High School, Middle School Treatment and Comparison School Students

The four high schools have been using the laptops for at least two years, with the Academy having been in the project for four years. Data for 2005 will be reported on the high schools as a comparison from previous years. However, a closer look will be given to the middle school (DeZavala) that began using laptops in 2004-2005 and a middle school that was selected as a comparison because they are not part of the laptop initiative. For Tables 6 – 12, the “a” denotes the high school level, the “b” denotes DeZavala Middle School (treatment middle school) and, when appropriate to compare, “c” denotes the comparison middle school. For example, Table 6a is high school and Table 6b is the treatment middle school.

High School Computer Use. As shown in Tables 6-12, 89% of the students reported taking their laptop home every day and 62% reported using their laptop at least two hours per week at home. Seventy-three percent (73%) reported they have access to another computer at home and more than half (57%) reported they also use it at home at least two hours per week. Sixty-nine percent (69%) reported they have access to the Internet at home, but just 32% reported they use their laptop on the Internet at home two or more hours per week. Apparently most of the Internet usage at home is through another computer, since 47% reported using another computer on the Internet at home two or more hours per week (see Table 12a). These percentages are very similar to those reported in spring 2004 for this group of high school students.

Regarding school use and technology, a high percentage (84.4%) of the high school students reported using the computer more than two hours per week at school and 81% reported using the Internet more than two hours per week (see Tables 13 and 14).

DeZavala Middle School Computer Use. As shown in Tables 6-12, 95% of the students at DeZavala MS reported taking their laptop home every day and 76.5% reported using their laptop at least two hours per week at home. Sixty-five percent (65.4%) reported they have access to another computer at home and more than half (52.6%) reported they also use it at home at least two hours per week. Sixty percent (60.3%) reported they have access to the Internet at home, and 44.5% reported they use their laptop on the Internet at home two or more hours per week. This percentage is higher than the high school students who reported 26% using their laptops on the Internet. The difference may be due to the higher reported access at the high school level to another computer at home.

Comparison Middle School Computer Use. As shown in Table 8c, 57.5% of the students in the comparison school reported having access to a computer at home. Thirty-three percent (33.2%) of these students reported using a computer at home on the Internet more than two hours per week. That is in comparison to the 41% from the treatment middle school who reported using the Internet at home more than two hours per week. As shown in Table 13c, 69.9% of the students in the comparison school reported using a computer 0-1 hours per week compared to the treatment middle school in which 84% reported using the computer at school more than two hours per week with 17.5% reporting using it more than ten hours per week at DeZavala MS. A similar trend exists in the use of the Internet at school, as shown in Tables 14b and 14c.

Use by Year in School. As shown in Table 15, most of the students completing surveys (48%) were in their first year of the Laptop Program, while 22.4% were in their second year. Sixteen percent (16.8%) were in their third year and 3.2% in their fourth year.

Table 6a.*How often do you take your laptop home? (Combined High Schools)*

	Frequency	Percent
Every Day (1)	2266	89.4
2-3 times a week	84	3.3
1 time a week	35	1.4
2-3 times/month	16	.6
1 time a month	12	.5
Never	123	4.9
Total	2536	100.0

Table 6b.*How often do you take your laptop home? (DeZavala MS, Treatment School)*

	Frequency	Percent
Every Day (1)	692	94.7
2-3 times a week	16	2.2
1 time a week	4	.5
2-3 times/month	2	.3
1 time a month	1	.1
Never	16	2.2
Total	731	100.0

Table 7a.*How many hours per week do you use your laptop at home? (Combined High Schools)*

Hours	Frequency	Percent
0-1 hours	955	37.7
2-4 hours	850	33.5
5-10 hours	412	16.2
More than 10 hours	318	12.5
Total	2536	100.0

Table 7b.*How many hours per week do you use your laptop at home? (DeZavala MS, Treatment School)*

Hours	Frequency	Percent
0-1 hours	172	23.5
2-4 hours	247	33.8
5-10 hours	144	19.7
More than 10 hours	168	23.0
Total	731	100.0

Table 8a.*Do you have access to another computer at home? (Combined High Schools)*

Home Access	Frequency	Percent
No	675	26.6
Yes	1861	73.4
Total	2536	100.0

Table 8b.*Do you have access to another computer at home? (DeZavala MS, Treatment School)*

Home Access	Frequency	Percent
No	253	34.6
Yes	478	65.4
Total	731	100

Table 8c.*Do you have access to another computer at home? (Comparison Middle School)*

Home Access	Frequency	Percent
No	137	42.5
Yes	185	57.5
Total	322	100

Table 9a.*How many hours do you use that computer at home? (Combined High Schools)*

Hours	Frequency	Percent
0-1 hour	1088	42.9
2-4 hours	717	28.3
5-10 hours	395	15.6
More than 10 hours	336	13.2
Total	2536	100.0

Table 9b.*How many hours do you use that computer at home? (DeZavala MS, Treatment School)*

Hours	Frequency	Percent
0-1 hour	346	47.3
2-4 hours	218	29.8
5-10 hours	96	13.1
More than 10 hours	71	9.7
Total	731	100

Table 9c.*How many hours do you use that computer at home? (Comparison Middle School)*

Hours	Frequency	Percent
0-1 hour	186	57.8
2-4 hours	91	28.3
5-10 hours	31	9.6
More than 10 hours	14	4.3
Total	322	100

Table 10a.*Do you have access to the Internet at home? (Combined High Schools)*

Home Internet Access	Frequency	Percent
No	797	31.4
Yes	1739	68.6
Total	2536	100.0

Table 10b.*Do you have access to the Internet at home? (DeZavala MS, Treatment School)*

Home Internet Access	Frequency	Percent
No	290	39.7
Yes	441	60.3
Total	713	100

Table 10c.*Do you have access to the Internet at home? (Comparison Middle School)*

Home Internet Access	Frequency	Percent
No	191	59.3
Yes	131	40.7
Total	322	100

Table 11a.

*How many hours per week do you use your school laptop on the Internet at home?
(Combined High Schools)*

Hours	Frequency	Percent
0-1 hour	1716	67.7
2-4 hours	417	16.4
5-10 hours	230	9.1
More than 10 hours	173	6.8
Total	2536	100.0

Table 11b.

*How many hours per week do you use your school laptop on the Internet at home?
(DeZavala MS, Treatment School)*

Hours	Frequency	Percent
0-1 hour	406	55.5
2-4 hours	162	22.2
5-10 hours	87	11.9
More than 10 hours	76	10.4
Total	731	100.0

Table 12a.

*How many hours per week do you use other computers on the Internet at home?
(Combined High Schools)*

Hours	Frequency	Percent
0-1 hour	1344	53.0
2-4 hours	563	22.2
5-10 hours	346	13.6
More than 10 hours	283	11.2
Total	2536	100.0

Table 12b.

*How many hours per week do you use other computers on the Internet at home?
(DeZavala MS, Treatment School)*

Hours	Frequency	Percent
0-1 hour	431	59.0
2-4 hours	186	25.4
5-10 hours	70	9.6
More than 10 hours	44	6.0
Total	731	100.0

Table 12c.

*How many hours per week do you use other computers on the Internet at home?
(Comparison Middle School)*

Hours	Frequency	Percent
0-1 hour	215	66.8
2-4 hours	75	23.3
5-10 hours	22	6.8
More than 10 hours	10	3.1
Total	322	100

Table 13a.

How often do you use a computer at school? (per week) (Combined High Schools)

Hours	Frequency	Percent
0-1 hour	395	15.6
2-4 hours	896	35.3
5-10 hours	735	29.0
More than 10 hours	510	20.1
Total	2536	100.0

Table 13b.

How often do you use a computer at school? (per week) (DeZavala MS, Treatment School)

Hours	Frequency	Percent
0-1 hour	31	31.6
2-4 hours	330	45.1
5-10 hours	125	17.1
More than 10 hours	45	6.2
Total	731	100.0

Table 13c.

How often do you use a computer at school? (per week) (Comparison Middle School)

Hours	Frequency	Percent
0-1 hour	225	69.9
2-4 hours	80	24.8
5-10 hours	14	4.3
More than 10 hours	3	0.9
Total	322	100

Table 14a.

How many hours do you spend on the Internet at school? (per week) (Combined High Schools)

Hours	Frequency	Percent
0-1 hour	489	19.3
2-4 hours	1105	43.6
5-10 hours	630	24.8
More than 10 hours	312	12.3
Total	2536	100.0

Table 14b.

How many hours do you spend on the Internet at school? (per week) (DeZavala MS, Treatment School)

Hours	Frequency	Percent
0-1 hour	231	31.6
2-4 hours	330	45.1
5-10 hours	125	17.1
More than 10 hours	45	6.2
Total	731	100.0

Table 14c.

How many hours do you spend on the Internet at school? (per week) (Comparison Middle School)

Hours	Frequency	Percent
0-1 hour	259	80.4
2-4 hours	55	17.1
5-10 hours	7	2.2
More than 10 hours	1	0.3
Total	322	100

Table 15.

How many years have you participated in the Irving Laptop Program? (Four High Schools, Middle School Treatment and Comparison)

Participation	Frequency	Percent
This is my first year.	1722	48.0
This is my second year.	803	22.4
This is my third year.	602	16.8
This is my fourth year.	116	3.2
I am not participating.	346	9.6
Total	3589	100.0

Summary of Middle School Treatment versus Comparison Data Regarding Access and Use

Quasi-experimental research design evidence was found to indicate that the TIP program is effective in enhancing technology skills among teachers. Treatment teachers as a group were higher on seven of eight technology proficiency self assessment categories spanning elementary and middle schools, when compared with teachers in their match-paired comparison schools. This event is significant at the $p = .03$ level. In addition, Concerns-Based Adoption Model (CBAM) Level of Use self-report measures were significantly ($p < .05$) higher for TIP Program (treatment) teachers than for teachers in the comparison group.

The quantitative student data gathered for this project reiterated the findings about the success of the professional development activities based on teacher data. Specifically, the overwhelming majority (95%) of the TIP Program students in middle school reported they take their laptop home "every day" and 77% reported using it at home two or more hours per week. Also TIP students who have access to other computers at home use them more than their comparison group counterparts: 53% reported using other computers at home more than an hour per week, compared with just 44% of those who had access at home in the comparison group who used an hour or more per week. Forty-one percent (41%) of the TIP group reported using other computers to which they had access at home for the Internet more than an hour per week, while in the comparison group only 33% reported using the Internet for more than an hour per week. Apparently this initiative has a positive influence on the use of other computers at home as well as on the use of the school-provided laptops.

Computer Attitudes and Technology Skills

Summary statistics for computer attitudes and technology skills of Irving high school students for both 2004 and 2005 are presented in Table 16. In Tables 17a and 17b high school and middle school TIP students are compared to a similar schools not in the program (both 2005 data). As shown in the last column of Table 17b, no significant differences ($p < .01$) were found between the attitudes and skills of those in the TIP program versus their comparison group peers.

Table 16.

Descriptive Statistics for Students from the Four Irving High Schools on Computer Attitude Questionnaire Scales, 2004 and 2005

	2004			2005			Effect Size
	N	Mean	Std. Deviation	N	Mean	Std. Deviation	
Computer Enjoyment	3996	4.01	.57	2536	4.03	.57	.04
Computer Importance	3996	3.95	.73	2536	3.95	.77	.00
Computer Anxiety	3996	4.15	.66	2536	4.15	.66	.00
Attitude Toward School	3996	2.87	.75	2536	3.00	.72	.18
Tech. Proficiency (TP) Email	3996	4.26	.90	2536	3.99	1.10	-.27
TP WWW	3996	3.97	.84	2536	3.79	.92	-.21
TP Integrated Applications	3996	3.95	.87	2536	3.80	.92	-.17
TP Skill	3996	3.92	.76	2536	3.50	.76	-.55

Table 17a.

Descriptive Statistics for Students from the Four Irving High Schools by High School on Computer Attitude Questionnaire Scales, 2005

	Irving HS			MacArthur HS			Nimitz HS			The Academy		
	N	Mean	Std. Dev	N	Mean	Std. Dev.	N	Mean	Std. Dev.	N	Mean	Std. Dev.
Computer Enjoyment	682	4.02	.59	1008	4.07	.58	307	3.98	.55	539	3.99	.56
Computer Importance	682	3.89	.83	1008	4.02	.73	307	3.92	.78	539	3.90	.76
Computer Anxiety	682	4.14	.70	1008	4.19	.66	307	4.133	.64	539	4.11	.63
Attitude Toward School	682	2.98	.76	1008	3.03	.74	307	3.02	.69	539	2.96	.66
TP-Email	682	3.78	1.27	1008	3.98	1.07	307	4.10	.96	539	4.22	.92
TP-WWW	682	3.64	.99	1008	3.81	.90	307	3.90	.80	539	3.87	.90
TP-IA	682	3.68	1.01	1008	3.88	.87	307	3.79	.82	539	3.81	.91
TP SKILL	682	3.36	.87	1008	3.53	.74	307	3.54	.69	539	3.58	.73

Table 17b.

Descriptive Statistics for Students from the Treatment and Comparison Middle Schools on Computer Attitude Questionnaire Scales, 2005

	N	Mean	Std. Dev.	N	Mean	Std. Dev.	Sig.
	Treatment			Comparison			
CAQ Enjoyment	731	4.12	.55	322	4.09	.57	.303
CAQ Importance	731	4.02	.75	322	3.95	.85	.192
CAQ Anxiety	731	4.19	.62	322	4.18	.65	.803
CAQ School	731	3.00	.72	322	2.98	.68	.717
CAQ Email	731	3.93	1.05	322	4.08	1.02	.041
CAQ WWW	731	3.81	.90	322	3.85	.94	.480
CAQ Integrated Applications	731	3.79	.92	322	3.71	.96	.154
CAQ Skill	731	3.49	.77	322	3.52	.80	.606

Perceptions of Laptops and the Laptop Initiative

Customized items were developed to assess student perceptions of their uses of laptop technology and of the laptop program in general. These are presented in individual sections in the narrative that follows.

Greatest Benefit of Laptops. As shown in Table 18a, most Irving high school students (53.1%) felt that the greatest benefit of the laptop initiative is that students can learn more. Also noteworthy is that 16.9% reported the top benefit as “school is more fun.”. The percentages for the 2005 data from the four high schools were very similar to the 2004 data. The top three choices by Irving students match the top three nationwide: 1) students can learn more, 2) school would be more fun, and 3) student projects would be better (NetDay, 2004).

As shown in Table 18b, most middle school students (51% and 53% for treatment and comparison schools respectively) felt that the greatest benefit of the laptop initiative is that students can learn more. While both schools rated the second highest benefit as “School is more fun”, the treatment school was higher (4.2%) than the comparison school (1.6%). A notable difference between the frequency responses between the treatment school students who have laptop computers and the comparison school is in the item, “Family members and parents can be more involved with my schoolwork and our school” where the treatment school students feel more strongly (4.2% vs. 1.6% #1 benefit) that this is a benefit of their technology access. The top three choices by Irving students match the top three nationwide: 1) students can learn more, 2) school would be more fun, and 3) student projects would be better (NetDay, 2004).

Table 18a.

What do you think is the #1 benefit of attending a school that has lots of technology available to everyone?(Combined High Schools)

	Frequency	Percent
Students can learn more.	1328	53.1
Students get along better.	55	2.2
Students get higher grades.	118	4.7
Student projects are better.	194	7.8
Group projects are easier to do.	193	7.7
School publications are better.	32	1.3
Teachers communicate better with students.	79	3.2
Teachers communicate better with other teachers.	23	.9
Family members and parents can be more involved with my schoolwork and our school.	56	2.2
School is more fun.	423	16.9
Did Not Respond	35	1.4
Total	2536	100.0

Table 18b.

What do you think is the #1 benefit of attending a school that has lots of technology available to everyone?(Middle School Treatment and Comparison Schools)

	Frequency		Percent	
	DeZavala MS (Treatment)	MS	Comparison MS	MS
Students can learn more.	374	51.2	171	53.1
Students get along better.	17	2.3	15	4.7
Students get higher grades.	40	5.5	24	7.5
Student projects are better.	69	9.4	31	9.6
Group projects are easier to do.	44	6.0	16	5.0
School publications are better.	12	1.6	3	.9
Teachers communicate better with students.	12	1.6	10	3.1
Teachers communicate better with other teachers.	2	.3	1	.3
Family members and parents can be more involved with my schoolwork and our school.	31	4.2	5	1.6
School is more fun.	118	16.1	39	12.1
Did Not Respond	12	1.6	7	2.2
Total	731	100.0	322	100.0

Feelings About Technology. As shown in Table 19, the most commonly-selected feeling among high school students in Irving was that they enjoy working with technology and learning new ways to use it. This category was selected by 53% of the respondents. Eighteen percent (n = 453) reported that they go beyond this stage to the point where they “often help friends with their technology problems and like showing them how to use

technology in different ways.” Only 6% reported that they “avoid using technology as much as possible”.

Regarding the middle schools in their feeling about using technology, they were both similar in the break-out of responses. However students from both middle schools were higher than the high school students on their computer enjoyment (third item) with responses of 58-59%.

Table 19.

*Which of these statements best describes your feeling about using technology?
(Combined High Schools)*

	Frequency	Percent
I avoid using technology as much as possible.	153	6.1
I use technology a lot but it’s just a tool for me, not a hobby.	572	23.0
I enjoy working with technology and learning new ways for me to use it.	1312	52.7
I often help my friends with their technology problems and I like showing them how to use technology in different ways	453	18.2
Did Not Respond	46	1.8
Total	2536	100.0

Free Time Use of Technology. The dominant form of free-time use of technology was “talking/emailing with friends and family members.” Forty-nine percent of the respondents reported this as their number one use. As shown in Table 20, playing games was a much less important use for this group of students than for the nation as a whole (NetDay, 2004).

The middle school response rates were similar to the high school frequencies. Notable was the reported frequency for the number one item of talking/emailing with friends or family being 37% for the treatment school and 44% for the comparison school.

Table 20.

In your free time, what is your #1 use of technology? (Combined High Schools)

	Frequency	Percent
Talking/emailing with friends or family members	1230	48.5
Playing games	373	14.7
Listening and downloading music	228	9.0
Getting information about places to go and things to do	210	8.3
I only use technology for my schoolwork.	213	8.4
I don’t have any access to the Internet outside of school	241	9.5
Did Not Respond	41	1.6
Total	2536	100.0

Importance to Education. The overwhelming majority (90%) of the high school students in Irving felt that having access to technology is “important” or “very important” to their education, with the balance in favor of “very important” (48%) for Irving ISD high school students. As shown in Table 21, only 8.5% felt that it is not very important.

The middle school students were slightly higher in their rating of the importance of access to technology with more than half categorizing access as “Very Important” Both the treatment and comparison schools were similar. About 5% from each of the middle schools marked “Not very important” as their response.

Table 21.

How important do you think having access to technology is to your education?(Combined High Schools)

	Frequency	Percent
Not very important	216	8.5
Important	1070	42.2
Very Important	1214	47.9
Did Not Respond	36	1.4
Total	2536	100.0

Change in Use of Technology. As shown in Table 22, many high school students (29%) felt that allowing students to use instant messaging and email at school was a change they would make in the use of technology, and many (32%) felt that having newer, better computers for student use was a desirable change. One noticeable difference from 2004 to 2005 responses was that the percentage for “Have newer, better computers for student use” went from 25.9% to 31.6% respectively.

From the middle school students point of view, the number one change was the same but notably fewer numbers of students at the treatment school rated “newer, better computers” as the one thing they would change. The treatment school student frequency rating was 34% while the comparison school was 44% making the treatment school number closer to the rating from the high school students who also have ubiquitous access to computers.

Table 22.

If you could change one thing about how technology is being used at your school today, what would that one thing be? (Combined High Schools)

	Frequency	Percent
Have newer, better computers for student use	801	31.6
Have online classes for subjects that are not taught at my school	349	13.8
Have teachers use email to communicate with students more frequently	227	9.0
Have a more accurate, up to date school website	126	5.0
Use online textbooks	262	10.3
Allow students to use IM and email at school	729	28.7
Did Not Respond	42	1.7
Total	2536	100.0

Obstacles to Student Use of Technology. As shown in Table 23, the primary obstacles students reported facing in the use of technology in their schools were: 1) School filters and firewalls (reported by 19%) (down from 31% in 2004), 2) Slow access to the Internet (reported by 20%), and 3) Computers don't work regularly (reported by 17.5%). Insufficient computers and computer locations or lack of time were rarely listed as obstacles. By contrast, lack of time in the school day was the number one obstacle to use of technology listed in the nationwide NetDay Survey (2004).

For the middle schools, the responses that were similar to the high school students and to each other was the percentage that responded with "Slow access time to get on the Internet" with 22% at the treatment middle school and 24% at the comparison middle school. They are similar to the 20% reported at the high schools. One item that seemed interesting was 19% of the treatment middle school students reporting "Limited teacher knowledge and skill" as an obstacle. Only 10% at the comparison middle school and 5% at the high school level reported that as an obstacle. A larger number of students (20%) at the comparison middle school reported their "computers don't work regularly" as opposed to the student responses (13%) at the treatment middle school.

Table 23.

What, if any, obstacles do you face in using technology at your school? (Combined High Schools)

	Frequency	Percent
Not enough computers	109	4.3
Computers are not in a convenient location to use	79	3.1
Computers don't work regularly	445	17.5
Outdated software	95	3.7
Slow access time to get on the Internet	512	20.2
Lack of time in the school day to use computers or access the Internet	197	7.8
Limited teacher knowledge and skill	128	5.0
School filters and firewalls	481	19.0
I don't know how to use the technology at my school	19	.7
No obstacles or none of the above	420	16.6
Did Not Respond	51	2.0
Total	2536	100.0

Most Effective Use of Technology. As shown in Table 24, students felt that technology was being used effectively in social studies/history (28.3% selected this area) and in English (18.5% selected this area). Art and music were rarely selected. An interesting change from the 2004 data was a large increase in the reported use in science from 9.1% to 18.6% reporting the subject area in which they think technology is most effectively used at school. The nationwide survey showed science, social studies/history, and English as the top three, in that order (NetDay, 2004).

The middle school students at both middle schools also ranked social studies/history as being the subject area in which they felt technology was being used most effectively.

Table 24.

In which subject area do you think technology is being used most effectively at your school? (Combined High Schools)

	Frequency	Percent
English	468	18.5
Math	192	7.6
Science	472	18.6
Social Studies/History	717	28.3
Foreign Language	73	2.9
Art	40	1.6
Music	59	2.3
Physical Education	24	.9
Yearbook or Newspaper	128	5.0
Career or Job Training	274	10.8
Did Not Respond	89	3.5
Total	2536	100.0

Frequent Uses of the Internet. As shown in Table 25, high school students frequently reported taking a test online (86%), writing a report based on information from the Internet (79%), emailing their teacher (57.5%) (down from 67% in 2004) and going to websites that have been set up for my school or class (65%) as things they do using the Internet. Three of these areas were also in the top three listed nationwide, but the order was 1) write a report, 2) go to websites, and 3) take an online test. Notable changes from 2004 Irving data includes an increase from 15.9% to 20.5% for contributing to a web log and a decrease from 66.9% to 57.6% for emailing a teacher.

For the middle school students the breakdown of the responses for both schools was very similar, with the exception of the use of Instant Messaging. Interestingly, the students at the treatment school use IM less (41%) than the students at the comparison school (48%). Another exception was the “Check on a class grade” in which case the treatment school used the Internet much more (48%) than the comparison school (28%).

Table 25.

Do you ever do the following using the Internet? (Combined High Schools)

	Frequency	Percent
Write a report using information from the Internet	2014	79.4
Take a test online	2172	85.6
Create a web page for a school project	634	25.0
Contribute to a web log	520	20.5
Check on a class grade	1136	44.8
Take a class online	346	13.6
Download a study guide	1255	49.5
Get help from an online tutor	375	14.8
Go to websites that have been set up for my school or class	1642	64.7
Use Instant Messaging to talk to a classmate about a class	1157	45.6

project		
E mail a teacher	1462	57.6
Use an online textbook	1246	49.1
Create a movie	547	21.6

Locations for Using Technology to Help with Schoolwork. Students overwhelmingly selected “at my school” (66%) or “at home” (24%) as the most likely places for them to use technology with their schoolwork. As shown in Table 26, a community center, the mall, or at a friend’s house were rarely reported. By contrast, in the 2003 nationwide survey 70% of the students reported “at home” as the most common place to use technology, and only 23% reported the most common place as “at my school” (NetDay, 2004). The Irving laptop initiative appears to have brought extensive computer use into the schools.

Both middle schools (treatment and comparison) reported their most common place to use technology to help with schoolwork was at school as well at 61% for each.

Table 26.

When you are using technology to help with your schoolwork, where are you most likely to be? (Combined High Schools)

	Frequency	Percent
At home	614	24.2
At my school	1667	65.7
At the public library	89	3.5
At a community center or after school club	21	.8
At the mall	18	.7
At a friend’s house	37	1.5
Did Not Respond	90	3.5
Total	2536	100.0

Location of Technology Use in School. As shown in Table 27, 81% of the respondents reported “in a classroom” as the place they use technology most often in school. This appears to be by far the dominant location and eclipses all other locations, including the computer lab. By contrast, nationwide 60% of the students reported “in the computer lab” and only 28% reported “in my classroom” the most often place to use technology (NetDay, 2004). These 2005 reported frequencies are very similar to 2004 high school student data in Irving.

The responses for the middle school students were similar with 64-65% reporting using technology most often in the classroom. However a higher percentage also reported using technology in the computer lab (13% at the comparison school and 19% at the treatment school).

Table 27.

When you are at your school, where at school do you use technology most often? (Combined High Schools)

	Frequency	Percent
In a classroom	2052	80.9
In a computer lab	95	3.7
In the school library	87	3.4
In the lunch room	119	4.7
In the college planning or guidance office	14	.6
I do not regularly use technology at my school	79	3.1
Did Not Respond	90	3.5
Total	2536	100.0

Perceived Level of Technology Proficiency. As shown in Table 28, the majority of the students (64%) consider themselves an average user of technology – about the same as most other students in their schools. Roughly 1 in 5 consider themselves advanced. These proportions are similar to those found nationwide (NetDay, 2004) and similar to Irving 2004 data findings and similar to 2005 middle school responses.

Table 28.

Thinking about the other students at your school, do you consider yourself: (Combined High Schools)

	Frequency	Percent
a beginner below the skills of most of the students at your school	284	11.2
an average tech user - the same as most of the students at your school	1612	63.6
an advanced tech user; more expert than most of the students at your school	548	21.6
Did Not Respond	92	3.6
Total	2536	100.0

Use of Technology for Schoolwork. As shown in Table 29, the vast majority of the Irving high school students (87%) reported that they use technology to help them with their schoolwork. This is very close to the percentage reported nationwide (NetDay, 2004) as well as the percentages reported for the Irving middle schools in this data set.

Table 29.

Do you use technology to help you with your schoolwork? (Combined High Schools)

	Frequency	Percent
No	188	7.8
Yes	2206	87.0
No Response	131	5.2
Total	2536	100.0

Most Frequently Used Technologies. High school students in Irving appear to make comparatively heavy use of their laptop computers. As shown in Table 30, 86% reported they make use of their laptop computer in a typically week. This value is the highest use rating among the technologies listed, surpassing use of desktop computers (59% use weekly) and cell phone usage (60% use weekly). By contrast, in the nationwide survey, laptop computers were reported 4th most frequently used, behind desktop computers, cell phones, and CD burners (NetDay, 2004). There were no notable changes from the 2004 data.

The only notable differences for the middle school students were between the treatment and comparison schools in that the treatment schools report using digital cameras and scanners more frequently than the comparison school. There was no notable difference between these two schools in any of the other uses.

Table 30.

In a typical week for you, which of these technology products do you use, either in school or in your free time? (Combined High Schools)

Item	Frequency	Percent
Desktop computer	1488	58.7
Laptop computer	2189	86.3
Cell phone	1522	60.0
PDA	172	6.8
Digital camera	990	39.0
Digital Camcorder	383	15.1
Scanner	571	22.5
CD burner	1022	40.3
MP3 Player	909	35.8

Types of Internet Tools Used. Irving high school students reported making weekly use of email (89% reported weekly use), Internet search engines (69%), and instant messaging (56% reported weekly use). As shown in Table 31, fewer than one-quarter reported weekly use of chat rooms (23%) or Web logs (22%). However the use of web logs increased from 14.4% in 2004 to 22.2% in 2005. These values are similar to those reported by students in the nationwide survey (NetDay, 2004).

Most of the uses of Internet tools are similar to the high school students, with some exceptions in the areas of Instant Messaging and Email where the high school students use it more. Some differences exist between the treatment and comparison middle schools. The treatment school reports using web logs more typically (24%) each week than the comparison school (18%), making the treatment school more similar in their web log use to high school students. Other differences were in the use of message boards where treatment school reported 25.2% while the comparison school reported 21% and the use of bookmarked sites for the treatment school was 51% while the comparison school was 44%.

Table 31.

In a typical week for you, which of these Internet tools do you use, either in school or in your free time? (Combined High Schools)

Item	Frequency	Percent
Email	2118	83.5
Instant Messaging	1429	56.3
Web log	562	22.2
Internet search engine	1746	68.8
Message boards	692	27.3
Specific Internet Websites that you already have bookmarked	1306	51.5
Personal site (ie My Yahoo)	1244	49.1
Chat rooms	578	22.8

Frequency of Repair/Maintenance. As shown in Table 32, approximately one-third (33%) of the high school students reported their laptop never needed technical support during the past year; approximately 30% reported needing technical support 1 time; and 25% reported needing support 2-3 times. Four percent reported needing technical support more than 7 times. These frequencies are very similar to those reported in 2004.

The middle school treatment school reported the number of times this year their laptop needed technical support was: 19% never, 20% one time, 21% two to three times, 4% four to seven times and 2% more than seven times.

Table 32.

How many times this year has your laptop needed technical support? (Combined High Schools)

	Frequency	Percent
Never	837	33.0
1 time	764	30.1
2-3 times	637	25.1
4-7 times	119	4.7
More than 7 times	91	3.6
Did Not Respond	88	3.5
Total	2536	100.0

Promptness of Laptop Repairs. Irving high school students were evenly divided in their opinions about whether their laptops “seldom got repaired quickly” (34%) or “usually got repaired quickly (28%). As shown in Table 33, 8% of the students responded that their laptops “always got repaired quickly.” For the treatment middle school, students reported the following regarding the quick repair of their laptops: 20% seldom, 25% usually, and 7% always.

Table 33.

Does your laptop get repaired quickly whenever it doesn't work properly? (Combined High Schools)

	Frequency	Percent
Seldom	851	33.6
Usually	710	28.0
Always	203	8.0
Never had repairs	673	26.5
Did Not Respond	99	3.9
Total	2536	100.0

Use of Laptop by Others at Home. As shown in Table 34, most high school students in Irving (68%) reported that no one else uses their laptop at home. However, another way of viewing this information is that more than one-fourth of the Irving students (28%) (n = 714) reported that their laptop is used by others at home. For the treatment middle school, 19% of the students reported that someone else at home uses their laptop.

Table 34.

Does anyone else at home use your laptop computer? (Combined High Schools)

	Frequency	Percent
No	1722	67.9
Yes	714	28.2
Did Not Respond	100	3.9
Total	2536	100.0

Frequency of Laptop Use by Others at Home. As shown in Table 35, 418 Irving high school students (16.5%) reported that someone else uses their laptop computer at home “every day” while another 310 (12%) reported that someone else uses their computer at home “once a week.” For the middle school treatment school, a smaller percentage (10%) reported that someone uses their laptop computer at home “every day” as well as a smaller percentage (8%) using it “once a week”.

Table 35.

How often do they use your laptop computer? (Combined High Schools)

	Frequency	Percent
Never	1453	57.3
Once a month	261	10.3
Once a week	310	12.2
Every day	418	16.5
Did Not Respond	94	3.7
Total	2536	100.0

Students Assisting Home Users. As shown in Table 36, more than one-third (35.3%, n = 894) of the high school students who completed the Irving laptop survey reported helping train other persons who use their laptop at home. For the middle school treatment

school students who reported that someone used their laptop at home, 24% reported helping them use it.

Table 36.

Do you help them? (Combined High Schools)

	Frequency	Percent
No	1513	59.7
Yes	894	35.3
Did Not Respond	129	5.1
Total	2536	100.0

Helping Home Users Find Things on the Internet. As shown in Table 37, 982 Irving high school students (38.7%) reported showing other users of their laptop at home how to find things on the Internet. Twenty-seven percent (27%) of the middle school treatment school students reported showing family members at home how to find things on the Internet.

Table 37.

Do you show them how to find things on the Internet? (Combined High Schools)

	Frequency	Percent
No	1441	56.8
Yes	982	38.7
Did Not Respond	113	4.5
Total	2536	100.0

Desire to Keep Laptop After Graduation. As shown in Table 38, 73% of the high school students in Irving expressed the opinion that keeping their laptop after graduation would be useful.

Table 38.

Would keeping your laptop after you finish high school be useful to you? (Combined High Schools)

	Frequency	Percent
Yes	1838	72.5
Not sure	459	18.1
No	136	5.4
Did Not Respond	103	4.1
Total	2536	100.0

Language/Culture Identification and College Aspirations

As previously reported in Table 4, 47% of the high school students responding to the Irving Laptop survey reported their ethnicity as Hispanic, while Table 39 indicates that more than one-third (34%) of the respondents have a language other than English spoken as the primary language in their homes. Yet, as shown in Table 40, 74% of the Irving

high school students expect to advance in school beyond the high school diploma. This high achievement desire, combined with the high attitude toward school reported for this group, implies there is great potential for these high school students to become productive citizens in society. Also, since a large number of students reported that their technology is being shared with one or more other person(s) in their family units at home (see Table 34), it would appear there is potential for the Irving School District initiatives to have positive impacts beyond the students who are allocated the laptops, and into the community as a whole. Further study is needed to determine the extent to which positive impact is taking place, and the ways in which it can best be further supported.

Table 39.

Is English the primary language spoken in your home? (Combined High Schools)

	Combined HS		Treatment MS		Comparison MS	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
No	852	33.6	323	44.2	121	37.6
Yes	1551	61.2	357	48.8	176	54.7
Did Not Respond	133	5.2	51	7.0	25	7.8
Total	2536	100.0	731	100.0	322	100.0

Table 40.

How far do you think you will go in school? (Combined High Schools)

	Frequency	Percent
Will not finish high school	36	1.4
High school diploma	185	7.3
2 year college degree	241	9.5
4 year college degree	747	29.5
Masters degree	575	22.7
Doctorate degree	308	12.1
Don't know	339	13.4
Did Not Respond	105	4.1
Total	2536	100.0

Open-Ended Comments. A wide variety of comments were received from high school students in Irving concerning their experiences with laptops. These can best be interpreted by educational leaders within the district and are listed, unedited, in Appendix A. Detailed analysis of these open-ended responses by persons knowledgeable about the Irving school environment may yield clues regarding the issue of how best to maintain and further nurture the positive student perceptions reported in the previous section.

Instructional Uses of Laptops in Classes

Table 41 contains the options provided for rating by students (on a Likert scale of 1 to 5), reordered from most frequent to least frequent use in class, based on mean student responses. The activities appear to fall into three clusters of usage frequency:

1. Very Frequently: use email to communicate with other students;
2. Frequently: use Blackboard to understand and discuss assignments, assess databases for reference materials, and work on projects that require more than one week, apply critical thinking skills, and carry out an experiment or research; and
3. Less Frequently: Access online libraries, design their own problems to solve, or use email to communicate with experts in their field.

These responses collectively indicate a healthy distribution of learning-related activities in the middle cluster, with possible concerns about the low incidence of students accessing online libraries, creating their own problems to solve or using email to seek advice from experts in a particular field – especially given the high incidence of email communication with other students reported for the top cluster. Opportunities may exist to target professional development in these low incidence areas, if they are perceived to be goals for educators and the district. These reported means are similar to last year. The only notable change is the smaller mean for using email to communicate with other students – down from 3.30 (weekly to daily) in 2004, to 3.08 (weekly) in 2005.

Table 41.

*In class(es) where my teachers use laptop computers, students ...
(Combined High Schools)*

Very Frequently	
	Mean (SD) n
Use email to communicate with other students	3.08 (1.16) n = 2489
Frequently	
Use electronic bulletin board (ex. Blackboard) to discuss academic content, issues, assignments	2.84 (1.12) n = 2494
Access online databases, reference materials, newspapers & periodicals	2.59 (.99) n = 2496
Work on projects that take one (1) week or more to complete	2.56 (.87) n = 2497
Work on projects that apply critical thinking and problem solving skills	2.53 (.97) n = 2488
Work on a project, gather data, conduct an experiment or research project	2.57 (.90) n = 2500
Less Frequently	
Access online libraries	2.22 (.96) n = 2500
Design their own problems to solve	1.95 (1.05) n = 2494
Use email to communicate with experts in a particular field	1.83 (1.07) n = 2495

Note: 1 = never, 2 = monthly, 3 = weekly, 4 = daily.

Gender Differences

Tables 42 and 43 contain descriptive statistics as well as levels of significance for the major indices recorded for Irving high school students, by gender for 2004 and 2005. Notable comparisons and contrasts are that most skill level measures are not significantly different by gender, and while males appear to make more use of information technology at home, females make more use of the World Wide Web in school. Females and males are equally comfortable with (not anxious about) computers. Some changes in gender differences from 2004 to 2005 include:

- gender differences in the amount of hours laptops are used at home is not longer significant; females went up from 2004 to 2005
- gender differences for Computer Enjoyment were significant in 2004 but not in 2005; females went up from 2004 to 2005
- gender differences for Computer Importance were significant in 2004 but not in 2005; females went up from 2004 to 2005
- gender differences for Attitudes Toward School were significant in 2004 but not in 2005; males went up from 2004 to 2005
- gender differences for Total Technology Skills were significant in 2005 but not in 2004; both males and females went down but males were lower in 2004 but higher in 2005

Other detailed comparisons can be conducted by the interested reader, based on the information in the Table 42.

Table 42.

Descriptive Statistics for Four Irving High School Males Versus Female Laptop Project Measures, 2004

Item	Gender	N	Mean	Std. Dev.	Sig.
Laptop Hours at Home	Male	1129	2.08	1.02	.000
	Female	1251	1.93	.95	
WWW at School	Male	1129	2.31	.92	.001
	Female	1251	2.43	.93	
Computer Enjoyment	Male	1129	4.05	.58	.000
	Female	1251	3.95	.57	
Computer Importance	Male	1129	3.97	.73	.019
	Female	1251	3.90	.73	
Computer Anxiety	Male	1129	4.14	.68	.442
	Female	1251	4.12	.66	
Attitude Toward School	Male	1129	2.80	.71	.000
	Female	1251	2.97	.75	
Technology Proficiency (TP)-Email	Male	1129	4.12	.97	.000
	Female	1251	4.31	.86	
TP-WWW	Male	1129	3.94	.88	.711

	Female	1251	3.95	.80	
TP-Integrated Applications	Male	1129	3.87	.90	.023
	Female	1251	3.95	.85	
TP-All Tech Skills	Male	1129	3.86	.81	.363
	Female	1251	3.89	.71	

Table 43.

Descriptive Statistics for Four Irving High School Males Versus Female Laptop Project Measures, 2005

	Gender	N	Mean	Std. Dev.	Sig.
Laptop Hours at Home	Male	1183	2.07	1.05	.113
	Female	1352	2.01	.99	
Computer Use at School	Male	1184	2.50	1.01	.062
	Female	1352	2.57	.95	
WWW at School	Male	1184	2.22	.95	.000
	Female	1352	2.37	.88	
Computer Enjoyment	Male	1184	4.04	.57	.486
	Female	1352	4.02	.58	
Computer Importance	Male	1184	3.95	.80	.958
	Female	1352	3.95	.75	
Computer Anxiety	Male	1184	4.17	.65	.229
	Female	1352	4.13	.67	
Attitude Toward School	Male	1184	3.00	.73	.945
	Female	1352	3.00	.72	
Technology Proficiency (TP) Email	Male	1184	4.03	1.08	.071
	Female	1352	3.96	1.11	
TP-WWW	Male	1184	3.82	.90	.051
	Female	1352	3.75	.93	
TP-Integrated Applications	Male	1184	3.83	.90	.083
	Female	1352	3.77	.93	
TP-All Tech Skills	Male	1184	3.53	.76	.036
	Female	1352	3.47	.79	

For the middle school students there were two areas of interesting differences by gender. As shown in Table 44, there were significant differences for the comparison school in how many hours males versus females use the computer at home, with females much higher than males. However for the treatment school, no gender differences existed regarding the amount of time spent on the computer at home. The trend was similar for

number of hours on the WWW at home but the difference was only marginally ($p = .08$) significant.

Another difference between the two middle schools regarding gender differences is related to computer enjoyment and computer anxiety. For the treatment school the males were significantly higher on computer enjoyment and had less computer anxiety than the females. This trend does not show up in the comparison school, as indicated in Table 45.

Table 44

Gender Differences for Treatment and Comparison Middle Schools for Computer Home Use, 2005

Item	Treatment/ Comparison	Gender	N	Mean	Std. Deviation	Sig.
Computer Hours at Home	Treatment	Male	365	1.85	.99	.945
		Female	366	1.85	.97	
	Comparison	Male	142	1.46	.67	.007
		Female	180	1.71	.93	
Hours on WWW at Home	Treatment	Male	365	1.62	.88	.759
		Female	366	1.64	.90	
	Comparison	Male	142	1.38	.65	.083
		Female	180	1.53	.83	

Table 45

Gender Differences for Treatment and Comparison Middle Schools on Computer Enjoyment and Computer Anxiety, 2005

Item	Treatment/ Comparison	Gender	N	Mean	Std. Deviation	Sig.
Computer Enjoyment	Treatment	Male	365	4.18	.52	.011
		Female	366	4.07	.57	
	Comparison	Male	142	4.05	.57	.374
		Female	180	4.11	.57	
Lack of Computer Anxiety	Treatment	Male	365	4.25	.57	.006
		Female	366	4.12	.66	
	Comparison	Male	142	4.15	.68	.575
		Female	180	4.18	.65	

Attendance, Discipline, and Achievement

Records of attendance, discipline, and achievement are gathered for Irving schools to fulfill state of Texas reporting requirements. These data were examined for TIP schools to search for possible impacts of the program. Findings are summarized in this section.

Attendance. Attendance data were compared over the last two years across the TIP schools, as well as between treatment (TIP) and comparison schools. No significant impact on attendance was found among the TIP schools during the first year of the project. Attendance has historically been high (> 95% ADA) for these schools and has remained so for the first year of TIP activities. The result is the same if comparison is done from the 1st to last six week trends within the TIP schools, or if the school is compared to its matched pair (comparison school) within category.

Discipline. Arguably the most positive measurable impact of the TIP program during the first year has been in the area of discipline. At the elementary school level, in the TIP program school discipline referrals decreased from .22 (percentage of enrollment referred) during 2003-04, before the program began, to .15 during 2004-05. By contrast, in the matched-comparison elementary school, discipline referrals remained constant at 21 from 2003-04 to 2004-05. At the middle school level, discipline referrals decreased from 17 to .15 in the TIP program school for 2003-04 vs. 2004-05 while referrals increased from .24 to .27 during the same time frame in the comparison school. Even at the high school level, where laptops had been in place in all schools for 1-3 years prior to the TIP project, the discipline referral rate remained relatively low during 2003-04 (.18) to 2004-05 (.21) for the TIP program school, while the aggregate of the two comparison high schools for which data were available increased from .28 in 2003-04 to .35 in 2004-05. Apparently the TIP initiative had a positive impact on (reducing) discipline problems in school.

TAKS Achievement. Previous research on the Texas Essential Knowledge and Skills (TAKS) scores has shown that 2 -3 years of a technology - enhanced intervention is typically required before measurable impacts on standardized achievement tests result, so no large improvements were expected at the end of the first year. A detailed examination of available data revealed there were many changes at all grade levels for both the TIP schools and the comparison schools. It appears that Lively 4th graders (treatment site) gained a large amount (11 points) in reading while the state went down and the district only went up 3 percentage points. Lively 5th graders went up 16 percentage points in reading while the district went up 13 (state-wide data were unavailable). Science scores went down during the same time period. It is unclear whether or not any of the Lively score changes can be attributed to laptops, but the trends exist nevertheless. These trends at the elementary level will be examined again next year to see if the positive outcomes continue to emerge in the data.

Conclusions

The collective picture presented by these data is that Irving middle school and high school students enjoy the use of technology and the vast majority use it regularly for their schoolwork. The image conveyed is one of positive outcomes from the student perspective. Further research is needed to determine causality, but the conjecture of the researchers is that this atmosphere contributes to the high ratings reported among Irving high school students for attitudes toward school, and may contribute to the high aspirations for going on to college reported by these students as well.

For some areas of assessment, it appears that in the middle school treatment school (for those students with laptops) students use their computers more in 'tool' rather than 'toy' applications mode. For example the treatment students used their computer less for IM and emailing with friends even though they have more access to use it for these applications. Further research is needed to determine if this finding can be replicated in other locations and over time.

Male versus female differences in perceptions of information technology are present in the Irving middle school students and are generally consistent with those from other published sources. However, in some cases (e.g. lack of significant differences in hours of use of the computer at home in the TIP project school) there are indications that ubiquitous access is leading to gender equality in the perception of and use of information technology. In the high school data, the overall trend is even stronger for this contention. The trends for both males and females from 2004 to 2005, across all high schools where all students have their own laptops, is that the two genders are coming closer together on many major indices where they were previously far apart.