Pew **Internet**
& **American Life**
PROJECT

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<u>THE DIGITAL DISCONNECT</u>

THE WIDENING GAP BETWEEN INTERNET-SAVVY STUDENTS AND THEIR SCHOOLS

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SUMMARY OF FINDINGS

Using the Internet is the norm for today's youth. A July 2002 survey by the Pew Internet & American Life Project shows that three in five children under the age of 18—and more than 78% of children between the ages of 12 and 17—go online. Due in large part to high profile and sometime controversial education technology public policy initiatives, it is conventional wisdom that much of this use occurs in schools. Not surprisingly, one of the most common activities that youth report undertaking online is schoolwork. Yet, little is known about student use of the Internet for schoolwork or about their attitudes towards the broader learning that can take place online. Nor has there been much exploration of the consequences of those teenage views for educators, policy makers, and parents.

To address this issue, the American Institutes for Research was commissioned by the Pew Internet & American Life Project to conduct a qualitative study of the attitudes and behaviors of Internet-using public middle and high school students drawn from across the country. The study is based primarily on information gathered from 14 gender-balanced, racially diverse focus groups of 136 students, drawn from 36 different schools. The student experiences and attitudes revealed in the study's focus groups were further supplemented by the stories of nearly 200 students who voluntarily submitted online essays about their use of the Internet for school.

Key findings from the study include the following:

Internet-savvy students rely on the Internet to help them do their schoolwork—and for good reason. Students told us they complete their schoolwork more quickly; they are less likely to get stymied by material they don't understand; their papers and projects are more likely to draw upon up-to-date sources and state-of-the-art knowledge; and, they are better at juggling their school assignments and extracurricular activities when they use the Internet. In essence, they told us that the Internet helps them navigate their way through school and spend more time learning in depth about what is most important to them personally.

Internet-savvy students describe dozens of different education-related uses of the Internet. Virtually all use the Internet to do research to help them write papers or complete class work or homework assignments. Most students also correspond with other online classmates about school projects and upcoming tests and quizzes. Most share tips about favorite Web sites and pass along information about homework shortcuts and sites that are especially rich in content that fit their assignments. They also frequent Web sites pointed out to them by teachers—some of which had even been set up specifically for a particular school or class. They communicate with online teachers or tutors. They participate in online study groups. They even take online classes and develop Web sites or online educational experiences for use by others.

The way students think about the Internet in relation to their schooling is closely tied to the daily tasks and activities that make up their young lives. In that regard, students employ five different metaphors to explain how they use the Internet for school:

- **The Internet as virtual textbook and reference library**. Much like a school-issued textbook or a traditional library, students think of the Internet as the place to find primary and secondary source material for their reports, presentations, and projects. This is perhaps the most commonly used metaphor of the Internet for school—held by both students and many of their teachers alike.

- **The Internet as virtual tutor and study shortcut**. Students think of the Internet as one way to receive instruction about material that interests them or about which they are confused. Others view the Internet as a way to complete their schoolwork as quickly and painlessly as possible, with minimal effort and minimal engagement. For some, this includes viewing the Internet as a mechanism to plagiarize material or otherwise cheat.

- **The Internet as virtual study group**. Students think of the Internet as an important way to collaborate on project work with classmates, study for tests and quizzes, and trade class notes and observations.

- **The Internet as virtual guidance counselor.** Students look to the Internet for guidance about life decisions as they relate to school, careers, and postsecondary education.

- **The Internet as virtual locker, backpack, and notebook**. Students think of the Internet as a place to store their important school-related materials and as a way to transport their books and papers from place to place. Online tools allow them to keep track of their class schedule, syllabi, assignments, notes, and papers.

Many schools and teachers have not yet recognized—much less responded to—the new ways students communicate and access information over the Internet. Students report that there is a substantial disconnect between how they use the Internet for school and how they use the Internet during the school day and under teacher direction. For the most part, students' educational use of the Internet occurs outside of the school day, outside of the school building, outside the direction of their teachers. While there are a variety of pressures, concerns, and outright challenges in providing Internet access to teachers and students at school, students perceive this disconnect to be the result of several factors:

- **School administrators—and not teachers—set the tone for Internet use at school.** The differences among the schools attended by our students were striking. Policy choices by those who run school systems and other factors have resulted in different schools having different levels of access to the Internet, different requirements for student technology literacy skills (e.g., some schools require students to take a course about basic computer and Internet skills, many do not have such a requirement), and different restrictions on student Internet access.

- **Even inside the most well connected schools, there is wide variation in teacher policies about Internet use by students in and for class.** In individual schools, teachers are the ones who choose whether to make assignments that require the use of

the Internet by their students, allow the use of the Internet (often as a supplement to other sources and tools), or even forbid its use. There are often wide variances in teacher attitudes about and uses of the Internet from classroom to classroom.

- **While students relate examples of both engaging and poor instructional uses of the Internet assigned by their teachers, students say that the not-so-engaging uses are the more typical of their assignments.** Students repeatedly told us that the quality of their Internet-based assignments was poor and uninspiring. They want to be assigned more—and more engaging—Internet activities that are relevant to their lives. Indeed, many students assert that this would significantly improve their attitude toward school and learning.

Students say they face several roadblocks when it comes to using the Internet at schools. In many cases, these roadblocks discourage them from using the Internet as much, or as creatively, as they would like. They note that:

- **The single greatest barrier to Internet use at school is the quality of access to the Internet.** Many schools confine Internet use to certain times of the day or certain places in the building (especially computer labs). It is also common, these students say, for schools to place further social and technological restrictions on their use of the Internet by, for instance, employing surveillance systems or requiring special teacher or administrator approvals.

- **While many students recognize the need to shelter teenagers from inappropriate material and adult-oriented commercial ads, they complain that blocking and filtering software often raise barriers to students' legitimate educational use of the Internet.** Most of our students feel that filtering software blocks important information, and many feel discouraged from using the Internet by the difficulties they face in accessing educational material.

- **Since not every student has access to the Internet outside of school, the vast majority of students report that their teachers do not make homework assignments that require the use of the Internet.** Most students noted that teachers feel it unfair to make assignments involving Internet use because some in the class do not have access to the Internet at home. We heard of more than one occasion when a teacher had made such an assignment only to rescind it because they worried that those without Internet access would have difficulty.

In light of the fact that the Internet is increasingly integrated into the home and school lives of students, and in the context of larger arguments about the use of the Internet for school, students' concerns can inform several policy debates about technology and education. This is what we heard:

- **Students want better coordination of their out-of-school educational use of the Internet with classroom activities. They argue that this could be the key to leveraging the power of the Internet for learning.**

- **Students urge schools to increase significantly the *quality* of access to the Internet in schools.**

- **Students believe that professional development and technical assistance for teachers are crucial for effective integration of the Internet into curricula.**

- **Students maintain that schools should place priority on developing programs to teach keyboarding, computer, and Internet literacy skills.**

- **Students urge that there should be continued effort to ensure that high-quality online information to complete school assignments be freely available, easily accessible, and age-appropriate–without undue limitation on students' freedoms.**

- **Students insist that policy makers take the "digital divide" seriously and that they begin to understand the more subtle inequities among teenagers that manifest themselves in differences in the quality of student Internet access and use.**

Of course, student use of the Internet for school does not occur in a vacuum. Students' experiences, and those of their states, districts, schools, teachers, and parents, strongly affect how the Internet is adopted in schools. Nonetheless, large numbers of students say they are changing because of their out-of-school use of the Internet—and their reliance on it. Internet-savvy students are coming to school with different expectations, different skills, and access to different resources.

Students are frustrated and increasingly dissatisfied by the digital disconnect they are experiencing at school. They cannot conceive of doing schoolwork without Internet access and yet they are not being given many opportunities in school to take advantage of the Internet. Many believe they may have to raise their voices to force schools to change to accommodate them better. In the final analysis, schools would do well to heed the Latin writer Seneca's words, which ring as true today as when they were written nearly 2,000 years ago: "The fates guide those who go willingly; those who do not, they drag."

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PART I: BACKGROUND AND INTRODUCTION

Prior Research on Student Use of the Internet for School

Since the mid-1990s, many education policy makers have promoted widespread access to the Internet in schools. From the launching of the Technology Literacy Challenge Fund in 1996 to the roll out of the E-rate discounts for telecommunications services in 1998 to the passage of the Enhancing Education Through Technology Act of 2001, national initiatives have rapidly expanded that access. By 1995, the majority of public elementary and secondary schools in the U.S. had access to the Internet. By 1998, the majority of instructional rooms in public schools (i.e., primarily classrooms and libraries/media centers) were connected to the Internet. With the notable exception of students attending schools in very poor districts, it is now the case that the Internet is as common a school fixture as lockers and library books.[1]

Over the same period, access to the Internet has been expanding in locations outside of school, especially to homes with school-aged children. By July 2002, Pew Internet & American Life Project surveys showed that 60% of America's children, more than 43 million children under 18, use the Internet. About 78% of those between the ages of 12 and 17 use the Internet (about 18 million pre-teens and teens).[2] In addition, more than one in five households with children (23%) have broadband connectivity through digital subscriber line (DSL) technology or cable modems.[3]

One of the most common activities that youth perform online is schoolwork.[4] According to a September 2001 study by the Pew Internet & American Life Project:

- Nearly every online teen (94% of 12 to 17 year olds who report using the Internet) has used the Internet for school research;

- 71% used the Internet as the major source for their most recent school project;

- 58% have used a Web site set up by school or a class;

- 34% have downloaded a study aid; and

- 17% have created a Web page for a school project.[5]

In addition to these school-related uses of the Internet, teenagers go online for a variety of other activities, including: communicating with friends and family (via email, instant messaging, and chat rooms); entertaining themselves (doing things such as surfing the Web for fun, visiting entertainment sites, playing or downloading games, and listening to music online or downloading it); learning things largely unrelated to school (such as looking for information on hobbies, getting the news, researching a product or service before buying it, looking for health-related information, and looking for information that is embarrassing or hard to talk about); and exploring other online interactive or transaction features (such as going to a Web site where they

can express opinions about something, visiting sites for trading and selling things, buying something online, creating a Web page, etc.).[6] Indeed, as Don Tapscott foresaw in his 1998 book, *Growing Up Digital: The Rise of the Net Generation,*[7] there is evidence that many students are more frequent users of the Internet and are more Internet savvy than their parents and teachers.

Most other large-scale research on school-related uses of the Internet—as distinguished from research on the use of computers and other technologies—has focused on access. This often consisted of measuring the extent of connectedness to the Internet and assessing the level of support for Internet use in schools (i.e., the amount and adequacy of teacher professional development and technical support). A few survey-based studies, most now several years old, provide some modest insight into the extent and types of Internet use in schools, though typically from teachers' or school or district administrators' perspectives.[8] Missing from this early research are studies that directly ask youth about their school-related activities, attitudes, and experiences with the Internet–in both in- and out-of-school settings.

More recently, researchers have begun to conduct studies about technology and Internet use based on the input of teenagers. Many of these studies focus on how young people generally use the Internet or they focus on the experience of one gender. These studies tend to describe students' use of the Internet for educational purposes in single settings (classrooms) or only in cursory fashion, or are conducted primarily to help companies better target product development and marketing activities.[9] Consequently, there is still a need for information about how teens use the Internet in school and for school. This is a topic rife with public policy implications.

This Study

The American Institutes for Research was commissioned by the Pew Internet & American Life Project to conduct the *Internet's Impact on School Project* (IISP). IISP was designed to describe the rich and varied ways that public middle and high school students use the Internet for school and learning, including their attitudes toward school-related uses of the Internet. Data for this study were collected between the months of November 2001 and March 2002 through two mechanisms:

- **Focus groups.** Drawn from three major metropolitan areas across the country, 12 gender-balanced, racially diverse focus groups were conducted of public middle and high school students who characterized themselves as heavy Internet users. Two additional focus groups of light Internet users, comprised of one middle and one high school group, were also conducted. Questionnaires were administered to each focus group participant in order to help characterize their school-related Internet use both in- and out-of-school. A total of 136 students, drawn from 36 different schools, participated in our focus groups.

- **Online solicitation of student stories.** To gain some further insight into student experiences and attitudes, IISP employed an innovative strategy to hear from students not able to participate in the study's focus groups—the online solicitation of student-

written stories detailing how they use the Internet for school. Nearly 200 middle and high school students from across the country wrote and submitted their stories to IISP through the study's Web site.

Further details about the study's sample and methods can be found in the Appendix to this report.

PART II: MAIN FINDINGS

The Schooling of Internet-Savvy Students

With the exception of two focus groups of students selected to provide insights into the experiences of non- or light-Internet users, we spoke to students with a range of Internet skills and experiences—from novices to frequent users to unabashed experts. While all the students in our groups use the Internet at school, often to conduct online research under teacher direction, most also use the Internet in other locations for significantly more time: at home, at a friend's house, at a relative's house, and, at the library or community center.

Many of the students in our sample were casual users of the Internet. These students may have an email account or two and may frequent their favorite Web sites while online, but their comments sometimes indicated only a basic understanding and familiarity with the many potential uses of the Internet. That is not to say that the Internet was unimportant to them, just that they might be as likely to do school work offline as online.

The students who were most striking to us, however, were those who were the most Internet savvy. Many of these students have been online for five or six years already; they are technologically literate; and they maintain multiple email addresses and instant messaging (IM) identities. While online, they frequently are multitasking: conducting research for a paper, printing an online study guide for a book they are reading, downloading music, instant messaging simultaneously with dozens of friends, emailing other friends, and preparing a PowerPoint presentation for class the next day. While they may not be online hours every day, these students rely heavily on the Internet for school and their social lives. The teen survey conducted by the Pew Internet & American Life suggest that perhaps 30% to 40% of teenagers fall into this Internet-savvy category. They represent a large and growing cohort of technologically-elite students.[10]

In fact, if you ask these students, as we did, what would happen to them if someone waved a magic wand and took their Internet access away, many would tell you—in all seriousness—that they would just die.

> *"It *__is__* my education. I get all my information off the Internet. I don't even look at books anymore."*
>
> **– High School Boy**

> *"I think most of us are just accustomed to using it. I mean we just think that it's there for us. And, I'm not sure if I'll phrase this right, but it's like we're…addicts. We need it and when you take it away it's not…it's a little bit harder to live without it."*
>
> **– High School Girl**

"I think the reason that we use the Internet so well and that we know so many things about it is because when it happened, we were there. So, it's not like it is some foreign language that we have to learn. It is something that we know, and we can apply what we know to find more things and then learn."

– High School Boy

What seems clear is that the experience of schooling recounted by many of the most Internet-savvy students in our group is fundamentally different from their parents. It is fundamentally different from their older siblings. Sometimes, it is fundamentally different even from their own classmates. Internet-savvy students believe that their use of the Internet helps them complete their schoolwork more quickly; prevents them from getting stymied by academic material they don't understand; lets them cite the most up-to-date material in their papers and projects; and, allows them to be better at juggling their school assignments and extracurricular activities. In essence, they told us they are better able to navigate their way through school and spend more time learning in depth about the things that are most important to them personally.

According to these students, some of their teachers try to take advantage of the extra "something" they seem to posses by asking them to share their skills and knowledge with their classmates. Other teachers try to limit these students and their Internet use in an attempt to reduce the very real differences between them and their less tech-savvy peers. Still other teachers are at a loss as to how to accommodate them or do not even recognize that their students have an increasingly new set of needs and expectations for learning that are based on using the Internet.

These students said over and over that their schools and teachers have not yet recognized—much less responded to—the fundamental shift occurring in the students they serve and in the learning communities they are charged with fostering. And, when teachers and schools do react, often it is in ways that make it more difficult for students who have become accustomed to using the Internet to communicate and access information.

In the sections that follow, we describe how Internet-savvy students think about the Internet, how they use it for school, and how they often experience barriers (real and perceived) to greater school-related use of the Internet. The paper concludes with several policy considerations that have been raised by the students themselves about how to exploit the Internet at school and in other learning situations.

Virtual Metaphors: How Internet-Savvy Students Think About and Use the Internet for School

"Creating class specific Web pages, updating the school's Web site, completing research projects, taking online class quizzes, learning interactively, translating text, contacting teachers when absent, and monitoring my grades are just a few of the more evident ways I use the Internet in and for school. Truthfully, there is no best use in my opinion."

– High School Boy

Internet-savvy students provided us with a rich portrait of how they use the Internet for school—describing literally dozens of online learning activities. Virtually all use the Internet to do research to help them write papers or complete class work or homework assignments. Most students also correspond with other online classmates about school projects and upcoming tests and quizzes. They frequent Web sites pointed out to them by teachers—some of which have even been set up specifically for a particular school or class. They communicate with online teachers or tutors. They participate in online study groups. They even take online classes and develop Web sites or online educational experiences for use by others.

The ways in which Internet-savvy students speak about the Internet in relation to their schooling is closely related to the daily tasks and activities in their young lives. In other words, the Internet's value for students is determined by the tasks they need to complete, the things they enjoy, and the things they want to learn both in and out of school.

> *"I'm constantly amazed at the vast resources that are available on virtually any topic that comes to mind. I rarely approach any assignment or question without first consulting online resources…. Practically every area of my life has been impacted by my experiences on the Web. The Internet has been a gift to my life."*
> **– High School Girl**

There is no single way to describe how these students use the Internet for school. Rather, students make reference to five different metaphors for how they think about and use the Internet for school:

- **The Internet as virtual textbook and reference library.** Much like a school-issued textbook or a traditional library, students think of the Internet as the place to find primary and secondary source material for their reports, presentations, and projects. This is perhaps the most commonly employed metaphor of the Internet for school—held by both students and many of their teachers alike.

- **The Internet as virtual tutor and study shortcut.** Students think of the Internet as one way to receive instruction about material they are interested in or about which they are confused or unclear. Others view the Internet as a way to complete their schoolwork as quickly and painlessly as possible, with minimal effort and minimal engagement (For some, this includes viewing the Internet as a mechanism to plagiarize material or otherwise cheat).

- **The Internet as virtual study group.** Students think of the Internet as an important way to collaborate on project work with classmates, study for tests and quizzes, and trade class notes and observations.

- **The Internet as virtual guidance counselor.** Students look to the Internet for guidance about life decisions as they relate to school, careers, and postsecondary education.

- **The Internet as virtual locker, backpack, and notebook.** Students think of the Internet as a place to store their important school-related materials and as a way to transport their books and papers from place to place. Online tools allow them to keep track of their class schedule, syllabi, assignments, notes, and papers.

These metaphors of how students think about the Internet are not mutually exclusive. They operate in a parallel fashion in their minds. The most Internet-savvy students—particularly those that are the most industrious at multitasking—are able to shift effortlessly and unconsciously among any or all of them during any one online session.

"You can do so many things at once. Like, if I'm on the Internet, I'm researching, doing homework, downloading music, and talking to people, and like, looking at Web sites…I do like five things at once on the Internet…and that's good."

– High School Girl

"Without the Internet, my work for school would be done in a much different way and would take a whole lot longer to do."

– Middle School Boy

It is this way—really, *these ways*—of thinking about the Internet for school that separates these Internet-savvy students from their teachers, school administrators, and parents—all those who seem to students to be struggling to figure out how to introduce the Internet into the educational ecosystem.

"I think…[school] would be a lot better if parents and older people would get more information about the Internet, because, I mean…I don't blame them, because they didn't grow up with the Internet…I think that if there was a better understanding from parents and older people than I think education would skyrocket a lot."

– **High School Boy**

Metaphor 1: The Internet as Virtual Textbook and Reference Library

"The Internet is basically, like, your local library times a thousand. [The material is] instantly available wherever there's a computer."

– High School Girl

"In a small town school…one does not get many chances to quench fervent desires for knowledge. Our science and history textbooks are at least a decade old, while most school projects require up-to-date, reliable information relevant to the new century. Science and the world have advanced significantly from ten years ago. Our textbooks are no longer the pillar, the heart of our education. On the contrary, they are a laughable supplement most of the time ignored. It is time

*to accept the new brainchild of the printed word. The Internet has become the
fastest way to find out about how exactly the Titanic sank (English project, 2002),
what kind of jewelry the people of ancient Indus Valley wore (Social Studies
project, 2000), or what exactly an anesthesiologist's day is like (Science project,
2001)."*
– Middle School Girl

Internet-savvy students told us that the online world offers many advantages over the
alternatives—school-issued textbooks and their school and community libraries. They said the
Internet is much easier and more convenient to access than their school and community libraries.
It is as close as the nearest Internet connection—which is often in their homes—and does not
require a ride in a car or bus to get to. It is open late into the evenings, over the weekends, and
over holidays. It is very important to them that online material is up-to-date (though of
sometime dubious quality), always available to everyone (as distinct from a library book that
might be checked out by a classmate), and is available on a vast array of interesting topics.

*"I still use books, but combining them with the information found online is what
makes them valuable in my eyes, because once textbooks are printed the
information in them becomes increasingly more stagnant, whereas, with the
always lively and ever-changing Internet, recent discoveries in any academic
topic are made readily available."*
– High School Boy

Students told us that school and community libraries have limited selections of
multimedia, while online sites routinely offer downloadable graphic images, photographs,
animations, video, and sound. School and community libraries require students to wait in line to
check out books or other materials and pay to use a copier machine to duplicate important
material for projects and reports. Material online, however, can be printed directly from the
Internet onto a local printer. Reproducing material in reports and projects without the Internet
requires students to re-type it or—literally—cut-and-paste it into a document with scissors and
tape. Online material can be virtually cut-and-pasted directly into digital reports, presentations,
and papers. And, students said, visiting the virtual library can be done while wearing pajamas,
eating a snack, listening to music, chatting with friends (via instant messaging or email), and
making sure your little brother or sister isn't getting into trouble while Mom or Dad is out
running errands.

*"[The Internet] made looking for these poems a whole lot easier than having to
go up to some strange librarian who was enjoying her Diet Coke and would do
just about anything to get these people out of the library to go on her break. The
Internet is like having a virtual librarian minus the bad attitude and breath."*
– Middle School Girl

While many students rely on the Internet as a virtual textbook and reference library, it can
also be a cause for frustration and anxiety. Perhaps the single greatest irritation facing students
is their use of search engines that point them to online information that is not trustworthy or
understandable to them. Students said that it is often hard to find information online that is

specifically related to the topic they are exploring and comprehensible at their age and grade level.

> *"I once took notes and wrote an essay from a 'perfect' site for a biography I was supposed to write on a famous person. All the information turned out to be wrong, and I had to do it all over again. We need to be protected from those embarrassing situations!"*
> **– Middle School Girl**

When asked how they find material online, the students in our group said they turn first to commercial search engines on the Web, such as to: www.google.com, www.yahoo.com, and www.askJeeves.com (or its companion site, www.ask.com). With varying degrees of sophistication, they probe long lists of links that often contain many irrelevant sites. For some of the less Internet-savvy students, using these search engines quickly and efficiently can be a significant challenge.

Another frustration students encountered was that not all of the sources they would like to use are available online and some of those that students would like to use require a payment or subscription fee to be viewed, downloaded, or printed. Students also expressed concerns about frequent interruptions by online advertisements, many of which have distinctly adult overtones to them. The persistence of these distractions (especially their "push" aspects as evidenced in multiple pop-up windows and pop-up windows that resist closing) stymies students, discourages them from using the Internet, and ties up their Internet connections and computers.

Finally, a number of these students feel that the Internet lacked sites written in languages other than English. They said they would like greater language diversity online. They want such sites so that they can communicate in a language they are studying or in their primary or secondary language.

> *"I think there should be a more diverse group of languages on the Internet so students who speak a different language can understand better."*
> **– Middle School Girl**

Metaphor 2: The Internet as Virtual Tutor and Study Shortcut

> *"I really try hard to get good grades in school, but sometimes it's hard. Especially when it comes to homework. But I heard about a Web site. I think the address is: www.about.com. Anyway, it helps you with homework that normally gets you confused."*
> **– Middle School Girl**

Our online students told us they view the Internet as a way to find material on subjects they want to pursue in more depth. It is also a source for information about subjects they find difficult to comprehend in school. Many find the information and study aids on the Internet genuinely useful in completing their day-to-day assignments. Others also noted that using the Internet is a way to complete their schoolwork as quickly and painlessly as possible, with minimal effort and minimal engagement.

While finding good tutorials online is sometimes a challenge for students, many reported that when they hit pay dirt, it often meant the difference between understanding a topic or not. For these students, the Internet provides ways of presenting material that differs from how it is presented in school, and this makes the material more understandable to them. In fact, students related that it was often the key to getting better grades in school.

> *"One time, it was right before my final exams in French last year, and my French teacher was not very good at explaining stuff at all, and I spent the entire year completely confused on like these five different verb tenses that he'd never managed to get across to me in class. And all of a sudden, like, the night before the final exam, I suddenly stumbled across this Web site that explained everything so succinctly and clearly that it made so much sense, and, you know, I emailed it to all of my friends... that was definitely good. Like I think the Internet is really good for these foreign languages."*
> **– High School Girl**

> *"I remember last year I took the IB [International Baccalaureate] program, and I was preparing for the IB psychology, but honestly our teacher is not qualified to be teaching the course. She admitted to us that the only reason she became a teacher was because it was too hard to become a psychologist...and so I hadn't really learned anything that year... I was searching on the Internet, and I stumbled across a site full of notes for the IB psychology test, and I used that to prep. Of course, I sent that to my friends too."*
> **– High School Boy**

Some students also participate in online chats and discussions with teachers (both their own and other teachers) to get assistance with their schoolwork. Particularly helpful for some students are tutoring Web sites that allowed them to submit questions and communicate, online, with a teacher about their specific work (for instance, www.mathnerds.com).

Still, students' reliance on such sites at times has a downside. Virtually all those in our focus groups reported that they or other students they know sometimes use these online study and tutoring sites as shortcuts to completing schoolwork or for completing assignments.

> *"I also use the Internet to actually find answers for stuff. I know it's a little unethical but there are tons of sites with answers to specific books I have. For example http://www.ihatevocab.com/ has all the answers to a specific workbook that I have. Also, sometimes I'll find essays on the Internet that match essay topics from school. I don't totally plagiarize them, but usually I will change the words and just take the overall ideas in them. I also use it to compare answers through emails with my friends and to find out what is due and when it's due."*
> **– High School Boy**

> *"I am still searching for a site where you can find your textbooks and answer your questions from the homework. I'm still trying to find the site for that. I mean I've come close but some of them do not provide all the answers."*
> **– High School Boy**

Indeed, as a virtual tutor, the "Internet" cannot and does not judge when it is providing appropriate extra help to a struggling student and when it is being used as an improper shortcut to answers. Sometimes, the same online material can be used both ways. To take but two examples, Web sites such as www.sparknotes.com and www.pinkmonkey.com offer free online summaries and analyses of books often assigned in school. Students report that these study aides are high quality and can be very helpful in disentangling complicated texts. Many indicate that reading book notes available to them on these sites was vital to their understanding of what they were reading and to participating in class. Others indicated—sometimes sheepishly and sometimes not—that it allows them to get away without reading the book. In fact, most of our Internet-savvy students admit to knowing students who plagiarize Internet resources or use other online tools to cheat outright.

Given a choice, students said they would like more opportunities to communicate with their teachers outside of class via email and instant messaging for extra help. In lieu of that opportunity, they turn to other resources external to their school on the Web.

> *"If we're on the same team, you can get a lot further with stuff. I've two teachers in the school who are online all the time, and they're available. I might be online with them…the fact that they're available for any small questions that I might have, that just helps open up an additional resource."*
>
> **– High School Boy**

Metaphor 3: The Internet as Virtual Study Group

> *"So it's not just the paradigm where the Internet is the library. It's not the library, it's a chat room…You can talk to people from somewhere else, compare notes, or whatever."*
>
> **– High School Boy**

Internet-savvy students also told us they use the Internet as a way to collaborate on schoolwork with their classmates. Employing email and instant messaging technologies, students say they create, join, leave, rejoin what might be called "virtual study groups" at will. Sometimes these study groups are synchronous – that is, students collaborate in real-time together. At other times, the collaborations are asynchronous: They occur with some time delay between communications to account for, say, dinner with parents or the time spent watching a television show.

> *"Not only do I do research online, but I also use it for chatting with people for school. If I forget my assignment or need assistance on a concept I can not grasp, the Internet is an easy way for me to get in touch with a peer who might be an aid to me."*
>
> **– High School Girl**

"In my school, the teachers don't really help you that much so they give you the assignment and tell you to do your best. But, a lot of people know a lot about search engines and you can learn a lot from them, from working in groups."

– Middle School Girl

"Yeah, if I am doing a project in school, I can go on the Internet and ask a good friend or something."

– Middle School Boy

Another reason students exploit virtual study groups is the ease with which they can share the information. Students say that it is common for them to use study groups to trade references to Web site links and sharing papers and presentations on which they are working–especially since one student can find a good resource and instantly share it with each of his or her friends. Many students report they like online study groups better than face-to-face ones because face-to-face study groups can be difficult to arrange and difficult to drop in and out of. An interruption or diversion does not necessarily disrupt a virtual study group. Virtual study groups allow students more control over their time and a way to more easily share materials as they simultaneously undertake both online and offline tasks.

Metaphor 4: The Internet as Virtual Guidance Counselor

Students also look to the Internet as an important source for advice on career and postsecondary options. Students say this virtual guidance counselor helps them select which college to attend, prepare for college admissions examinations, and complete college applications. Indeed, a Pew Internet & American Life survey in January showed that 11 million Americans who chose a school or college for themselves or a child in the past two years say their use of the Internet played a crucial or important role in that decision.[11]

"I have used the Internet also to find out stuff about colleges. There are lots of Web sites out there that give reviews on colleges and just different data."

– High School Boy

"Now I'm even looking for a college to go to in three years. I [don't] like to… have to worry about it at the last minute."

– High School Girl

"I can find out what I can expect in the next grades up, or, if I think a little further, what college I might attend. If someone recommends a university online and I'm interested, I can just pull up another window and search for that on the Web and find out more."

– Middle School Girl

Some students view job search sites, such as www.monster.com or www.hotjobs.com, as a way to learn more about what is required of workers in various industries and what sort of salaries they might expect. This information, they noted, is typically not readily available from

school guidance counselors or parents, so the Internet fills a very important informational role for them. Others seek out specialized sites with pertinent career information.

> *"We got on the Internet and did research on the job we wanted when we were older. I want to be a veterinarian. I learned how much they make, and what qualifications are needed to be a vet."*
>
> **– Middle School Girl**

> *"The site that I am on the most is http://projectgreenlight.liveplanet.com/. Considering that I would like to be a movie screenwriter, this site is perfect. It has contests, message boards, scripts, and lots more."*
>
> **– High School Boy**

Importantly, many students told us they rely heavily on the Internet because they do not have much in the way of tutoring and counseling resources offline or do not feel comfortable in using them. In addition, they said the Internet provides a number of other advantages for them: As a resource, it is always available. It has "patient" character. It allows them to be anonymous, if they choose. It is non-judgmental. And, perhaps most important, it allows them to do many things at the same time.

> *"There are lots of people that don't realize what they have to do to graduate so when they are seniors they say 'Oh my gosh, I have to make up these classes.' So, I think it would be a good idea if you could check and have that access, because you could go to your counselor, but most don't."*
>
> **– High School Girl**

Metaphor 5: The Internet as Virtual Locker, Backpack, and Notebook

A major part of school consists of managing information, materials, and paperwork. Students report they used the Internet to not only gather important materials and documents, but also to transport them back and forth to school, to work, to their friends' homes, and to all of the other places they frequent.

> *"The great thing about the Internet from my point of view is that it saves me having to carry two hundred pounds worth of books, my binders, my work, my whatever paper I'm working on....I have all my stuff. I have a hotmail account. I email myself every paper I'm working on and I know I've got the computer here, I've got the computer at my internship and I've got it at home. So, wherever I am, if I have a couple of free minutes, I pull it out, get whatever paper I'm working on, go with it, and when I'm done I email it back to myself...I've got a couple of different versions that I can work on anywhere and wherever I am, and be able to finish anything that I'm working on piecemeal. Serious!"*
>
> **– High School Boy**

> *"We need to send our schoolwork to ourselves. If you can't do that, then how can you get it to yourself?"*
>
> **– High School Girl**

"Disks are annoying…they always crack in your bag and stuff."
– High School Boy

Many students told us they maintain records of emails and links to important Web sites, including sites for their school assignments, course syllabi, required readings, grades, attendance records, school schedules, and school course catalogs.

"The Internet [was] also…very useful to inform me about an upcoming event happening at school. Doing this saved the school a lot of money on postage or phone bills. If schools would have a Web site, they could inform people about snow days, activities, lunch menus, and so on."
– Middle School Boy

Some students reported having school-allotted network space in which they could store their files. Most students do not have this level of access via their schools, however, and would like it. Indeed, when they could depend on access, students told us that using the Internet as virtual locker, backpack, and notebook saves them time and makes their lives more convenient.

Digital Disconnect: How Students Use the Internet During School

Conventional wisdom suggests that schools should be the focal point for educational Internet use. After all, Internet access in schools and classrooms has dramatically increased in recent years due in large part to high-profile public policy initiatives at the federal, state, and local levels. Policy makers and administrators have focused resources on improving the professional development of teachers to integrate technology into their classrooms and whole new categories of school personnel—state, district, and school instructional technology coordinators—have emerged to assist with technology planning and implementation.

Yet, the vast majority of students from whom we collected data say their use of the Internet at school is altogether another matter. While students do indeed rely on the Internet to complete their schoolwork and manage their day-to-day educational activities, they say their Internet use occurs mostly outside of the school day, outside of the school building, outside of the direction of their teachers.

"At our school, we don't use the Internet. We have it available but it's mostly for the high school students. The older kids, they have the Internet class…. If you want to use the Internet for a project, it has to be on your own time…at home, or whatever."
– Middle School Boy

The primary reasons for this digital disconnect between how students use the Internet for school and how schools have them use the Internet are tied to the ways that schools and teachers are oriented towards the Internet, their inability in many instances to integrate online tools into schooling, and the real and perceived barriers students face as they seek Internet access.

School Administrators Set the Tone for Student Internet Use

Internet-savvy students make clear that school leaders—more so than individual teachers—set the tone for Internet use in their classes. The differences across schools from which our students were drawn are striking. Schools have different levels of access to the Internet, different requirements for student technology literacy skills (i.e., some schools required students to take a course that taught them basic computer and Internet skills, others had no such requirement), and different restrictions on student Internet access.

> *"The quality of the computers at my school is very poor, which is an enormous factor in the limited time that I have for Internet usage…. I would hope that my school is thinking about upgrading or even replacing the overused computers in my school, especially in my computer lab. The teachers are always asking the network administrator to come and fix the broken ones, but it seems as though he is way too busy to worry about those kind of things."*
> **– High School Boy**

Some of the more Internet-savvy schools offer a range of classes that require the use of the Internet—on such topics as Web site design or e-commerce—or allow students to take wholly online courses. Other schools maintain school Web sites that contain up-to-date information about the school, its schedule and events. Some schools encourage teachers to provide their email addresses to students and their parents. And, some Internet-savvy schools even provide students with remote access over the Internet to password-protected personalized network folders and files—online access to virtual school lockers, if you will. In contrast, some of the less Internet-savvy schools our students described offer fewer opportunities for students and teachers to go online during the school day, are more likely to have teachers with weak technology skills, and are generally less inventive in their Internet use.

Teachers Direct Students to Use the Internet…or Not

While in school, it is teachers who manage the use of the Internet by students. They choose whether to make assignments that require the use of the Internet by their students, allow the use of the Internet (often as a supplement to other sources and tools), or even forbid its use.

> *"We use the Internet at school just because the teachers tell us to. Mostly, I use the Internet for school in history, because our teacher gives us worksheets."*
> **– Middle School Girl**

> *"Well, I never had a teacher that assigned an assignment that was based completely on the Internet."*
> **– High School Girl**

> *"I'm taking a course called video production, and our teacher is telling us not to work out of books. She actually requires us to do our stuff on the Internet. There's this one Web site that we usually go to."*
> **– High School Boy**

"Sometimes our teacher gives us a whole entire page of work we need to do on the computer, and we'll work in partners and will spend the whole entire day just learning about the things our teacher tells us to learn, and then we write it all down on this paper and turn it in at the end of class."
– Middle School Boy

"I never really got an assignment that specifically said you have to use the Internet."
– High School Boy

The decision to make an assignment involving use of the Internet is influenced by many factors: the ease of in-school access to the Internet, the school's orientation toward the use of the Internet, a teacher's Internet skills and knowledge, and a teacher's sense of whether students have home access to the Internet or not.

Students also told us that the types of assignments that teachers make and how often they make them is a function of the subject matter they teach. The students told us that teachers of social studies/history, science, and English classes are the most likely to assign them work that requires the use of the Internet. Math teachers were reported to be the least likely to use the Internet in their classrooms.

Some Internet-Based Assignments Are Engaging, Many Are Not

"Our teachers usually... don't really know what to do with it."
– High School Boy

The way that students use the Internet for school is largely driven by the kinds of activities and assignments that teachers create. Thus, we asked students to tell us about the kinds of Internet-based activities and assignments they receive from their teachers. We asked students to cite examples of "good" Internet-based assignments given to them by their teachers that engaged and excited them about the topic they were learning. We also asked students to tell us about "bad" Internet-based assignments that seemed either unconnected to what they were learning, or misused the Internet, or were a "waste of time" or boring. While students in all of our focus groups were able to relate examples of both exciting and poor instructional uses of the Internet, they said that the not-so-engaging uses were the more typical of their teachers' assignments.

"A...[biology] teacher made us go online and take surveys and it was the stupidest thing I've ever seen in my life. We did surveys on the parts of a frog that we knew. It was really pointless and dumb."
– High School Girl

"We'd all have to go into the library and use the Internet. Like, it would be so much simpler to use an encyclopedia or book. I mean that sometimes teachers just want you to use the Internet because its the Internet - let's integrate it into schools...Sometimes teachers just don't know...when it's easier to read a book and when it's easier to use the Internet."
– High School Girl

"Doing labs online - that's stupid. I think practical is much better. Interactive dissecting. It's stupid."
– High School Boy

"My teacher had us do a review of a Web site that didn't have very much content to review. It was a pretty good Web site, but there just wasn't much to review about it, so...that wasn't very much fun."
– High School Boy

"In English class last year we were supposed to be working on a Web page, but we got bored and downloaded music."
– High School Girl

"I also wholly agree about teachers generally encouraging people, at least at my school, not to use the Internet. I remember, at least one teacher gave me an example, about some student who once turned in a paper with a citation from a Web site that claims the government created AIDS to control the population, and she said this was just some crazy guy, and it really didn't work out."
– High School Boy

"I also use this online [career-matching program]. Its pretty worthless and a waste of money. It helps you decide what you should do after high school. It told me I should be a bowling machine repairman. I swear it said that. It is ridiculous."
– High School Boy

Despite the apparent prevalence of poor or rote uses of the Internet, students did speak at length about activities and assignments their teachers had developed that sparked their interest for learning, that exposed them to information and images of actual people and places, and otherwise helped students connect their day-to-day lives to their schoolwork.

"I had a little group for my history class where, we, everybody in the class had to do a project, and my group was doing a painting of the west pediment of the Parthenon, and we had to use the Internet to find out what the sculpture actually looked like so we could paint it, because we had no idea what the sculpture looked like, and couldn't paint it, which…and this would have been extremely hard to get without the Internet, we had to find the names of all the people in the sculpture and who they were, and we succeeded."
– High School Boy

"Some really interesting ways that we use the Internet in school is for fun stuff like scavenger hunts, which have been done on the Olympics, poets, and famous figures like Abraham Lincoln. We have also made Web pages in Business class, which were centered around…what our interests are and what we are like in character."
– Middle School Boy

"Teachers ask us to use the Internet on projects, essays, vocabulary words, or they may just have some odds and ends for us to do. In the subjects like Science, Religion, Social Studies, Computer, Language Arts, Family and Consumer Education we have used the Internet. Teachers give us worksheets and then we have to go to the Web sites and find the answers. Some are very easy and some are very hard…. Also some of the assignments we get I love because we get to research some people we like or Black Americans like Jesse Owens."
– Middle School Girl

"For chemistry, we actually go to these sites. Some of them are actually helpful. There are interactive movies that explained things. It was really a good way to study."
– High School Boy

"In Science, we had to do this project on volcanoes. [Our teacher] said maybe you should go on the Internet to find out and see if there's more things you can learn about volcanoes...When I went on the Internet and it had more things like why the volcano will explode and the types of gases inside of it...or if there are any close to cities around the world - that kind of stuff. So, it made it easier to understand it and I got a good grade on my assignment."
– Middle School Boy

"What we are supposed to do is try and piece out a history of our family tree. Our teacher wanted us to see if we could find out from information on the Internet. She gave us some sites and others she wanted us to find out on our own. I found the Internet really helpful for that."
– Middle School Girl

In our conversations with students about the quality and nature of their Internet-based assignments, they repeatedly told us that they wanted to be assigned more—and more engaging—Internet activities that were relevant to their lives. Indeed, many asserted that this would significantly improve their attitude toward school and learning.

Real and Perceived Barriers to Student Internet Use at and for School

The Internet is used differently by students depending on whether the use occurs inside or school or outside it. One reason for this disparity, of course, is time use. Within a typical six-hour school day, students routinely move from place to place and from teacher to teacher, from math class to lunch to gym to English class, etc. There is simply not much time within the school day for students to be sitting at Internet-connected computers. Skipping lunch to be able to access the Internet for 10 or 15 minutes during the school day was seen as an acceptable trade-off for some students who felt like they needed that little extra in-school access. That situation contrasts sharply with the online experiences of Internet-savvy students once they leave school. Some of the heaviest Internet-using students are online several hours a day—from when they

come home from school until dinner and sometimes after dinner as well. Students are simply much more in control of their time out of school than inside it.

In addition to time, the most substantial barrier to using the Internet at school is a lack of easy access to it. In many cases, this limited access has to do with a lack of enough Internet-connected computers—that are also in working condition—in schools and classrooms.

> *"When I go to school, it takes a long time to get online, and by that time, the project you're trying to do is already half over...it's no use anyway."*
> **– Middle School Girl**

However, even in schools with considerable numbers of Internet-connected computers, students described the lack of access as more of a function of restrictions placed on their use. Within a school, access to the Internet is largely controlled by teachers—teachers whom students describe as being motivated primarily by fear of what might happen if students use the Internet inappropriately. Of course, this is perhaps justified by the fact that students reported that some of them do use the Internet inappropriately at times to view adult-oriented sites, to shop while in school, to pirate and download music, etc.

> *"With all these benefits to the Internet, there are downfalls as well. Along with all the useful information, there are Web sites that have to be restricted and monitored. This can be a hassle for parents and administrators. However, just like everything else, people have to be responsible, and in doing this, a lot of good can come."*
> **– High School Girl**

> *"At our school, we're not allowed to use the Internet any more because some students were getting into bad stuff and then they take it out on us…. We have to go to the administrator – we have to ask her and she has to give us permission. Then we're allowed to go on it."*
> **– Middle School Girl**

> *"There are lab people who have a monitor and can send a message to say, 'You shouldn't be doing this.' I was looking up cattle one day, and the message said, 'you can't be here and you have to get off of it.'"*
> **– High School Girl**

> *"There is a way for them to get into your computer. You can be doing things and they can just take over your computer. One day I was emailing a friend some work when she was sick at home. The monitor told me I shouldn't be doing that. The principal came down and when they read it they said, 'O.K.'"*
> **– High School Girl**

While many students recognize the need and a desire to shelter teenagers from inappropriate material and adult-oriented commercial ads, they complain that blocking and filtering software raise significant barriers to their legitimate educational use of the Internet.

"A lot of time when you use the Internet at school, you'll get on a site – even for educational purposes – and you'll be blocked out...They don't think you can handle it, so it hinders your research. I went on to the history page and I typed this thing about a country that I was doing and they wouldn't let me see it and it happened four times and it got on my nerves so I stopped using the Internet for [the project]."

– High School Boy

"Whenever I'm on the Internet here at school, there's always somebody walking around behind you, checking over your shoulder to make sure you're not doing anything inappropriate. I think if you are going to learn, you have to do some inappropriate things. If you're learning history, you can't just learn what is proper, you have to go read what others have written and some of it may just be inappropriate."

– High School Boy

In addition, many students describe schools that do not allow them to access their outside email accounts—the vast majority of students are not provided with school-sanctioned email accounts. In many cases, schools also prevent students from using instant messaging technologies, save their files to the school network, visit Web sites that teachers do not explicitly authorize them to visit, and—in perhaps the most extreme case we heard about—perform "right clicks" of their mouse to launch a (seemingly) innocuous pop-up menu within the Microsoft Windows operating system.

"Another thing about our computers at school is that they are all protected. You can't even 'right click,' you can't send things or save things. You can't use the 'right click' or the 'start menu,' so it's a waste and a hassle...I'd rather use the computer at the library or my house."

– High School Boy

One clear opportunity to leverage the use of the Internet for school would be for teachers to assign Internet-based homework to students. While some students report that their teachers do assign Internet-based homework, the vast majority says their teachers make no such assignments. In fact, we heard of more than one occasion when a teacher had made such an assignment only to rescind it shortly thereafter. Why? Not every student has access to the Internet outside of school. Strikingly, students in every one of our focus groups provided this same rationale to us.

"I want to point out that at most schools, they don't really require you to use it at home, because, like I say, everybody doesn't have access to the Internet, whether it be at home, or maybe they take it to a library, or, like our schools may not have Internet."

– Middle School Boy

"They don't assign Internet usage because some kids don't have the Internet or have computers, so we do most of it in the lab."

– Middle School Girl

"Like I said about that science project, at the school they don't assign it. If you honestly want to, you can do it at home...mostly, they don't assign things for home on the Internet."

– Middle School Girl

"I think it really depends on the school here, though, because in my school teachers don't expect that every student has the Internet.... Our school is different...we don't have a lot of rich people, so we don't have a real nice school. When I was...[at another school], we actually did get a lot of assignments, Internet assignments."

– High School Boy

"My teachers, they don't actually require you to do anything online, unless they're taking you to a lab to do it, because some people don't have the Internet at home, so they can't get on."

– High School Boy

The reality, of course, is that not all students have computers at home. Even some who have computers are hampered because they are broken or outdated. Others have computers but do not have Internet access.

"My friend, she doesn't have a computer. I don't know how she does her stuff, but she doesn't have a computer or Internet."

– High School Boy

"I know a lot of times a lot of people say, 'Oh, you can go online and do such and such.'...And even if you don't have [the Internet] they say, 'Oh, you can use the library.' Sometimes that's hard for people. You don't have a computer and maybe you don't have the transportation to the library and it makes it really hard."

– High School Girl

Some students feel, however, that certain of their peers might exaggerate this lack of access—that students would claim not to have access to the Internet outside of school when they really did—as a way to avoid extra work.

"It's not like there aren't computers in the library and they're available all the time so I think it's a pretty stupid excuse [that you don't have a computer.]"

– High School Girl

Either way, our focus group students seem to think that their teachers do not always have a good handle on the ease with which students could access the Internet outside of their particular class.

PART III: CONCLUSION AND IMPLICATIONS

*"Overall, I really think that the Internet has a great impact on how much I learn
at school and without it I don't think that I would have the opportunities to learn
as much as I do."*

– High School Girl

"We learn so much from just one click of the mouse."

– High School Girl

The public policy debate surrounding the use of the Internet for education is full of
hyperbolic claims for its future impact. Some promote the Internet as a silver bullet for
education, asserting that its use in schools will transform teaching and learning, raise scores on
standardized achievement tests, and improve teacher quality to the degree that ill-prepared
middle and high school students will turn—as if by magic—into Ivy League-caliber honors
students. Others argue that the introduction of the Internet into schooling is a symptom of a
society that values technology and efficiency over moral values and personal connections, and
that it represents the further encroachment of big business into private spaces and personal lives.
Our conversations with students lead us to see each of these claims as being partly true and also
partly false. What strikes us most about those who predict the future, however, is that they only
very faintly take account of the voices and experiences of students themselves.

We found that Internet-savvy students are articulate and pragmatic consumers of their
educations. By the time they enter high school, if not before, many understand what is required
of them to succeed in school, the importance of good teachers and access to adequate resources,
and the need to supplement what they learn in school with outside interests and experiences. On
a daily basis—consciously or not—they make choices about the tradeoff between getting good
grades and having the in- and out-of-school learning experiences they want to have.

*"I think that school does a good job of providing you with a general education,
but I think that most of what it does is pretty basic. I think that if you really want
to get a good education, then most of the responsibility is placed on the students –
at least this is what I've gotten from my school – and it is up to you to go above
and beyond what the teacher presents. You know, you can easily not do the
reading in history and get away with it, but you won't be learning very
much....You just have to have the motivation to actually study and want to not just
get the A or whatever, but to actually understand the material and be able to
apply it."*

– High School Girl

These students told us that the Internet helps them. It saves them time and allows them to
manage their busy lives better, seek out new ideas and experiences, and keep connected with
friends and family. They are not afraid of it or in awe of it. They realize that relying on it is not
without serious drawbacks at times. Yet, having grown up with it, they use it, they like it, and
they rely on it.

"Life without the Internet would be odd. I've grown used to using it in school since we got it four years ago. I almost take it for granted sometimes. It can make schoolwork easier, but every now and then it will set you back. Like everything in life, it has its advantages and disadvantages."
– High School Girl

Students usually have strong views about how their school experiences could be made better. Their analysis of how the Internet can be exploited in educational settings illustrates this point perfectly. Here is what they say they would like to see happen:

- **Students want better coordination of their out-of-school educational use of the Internet with classroom activities. They argue that this could be the key to leveraging the power of the Internet for learning.** We found that the overwhelming majority of student use of the Internet for education happens outside of schools and outside of teacher direction. While policy makers, researchers, and many journalists focus on teacher-directed in-school use of the Internet as the test of the Internet's effectiveness for education, students told us they use the Internet for school much more frequently and in a greater variety of ways outside of school at their own initiative. These students would like schools to recognize that the online world is full of resources that would make classroom lessons more compelling and make complex topics easier to understand. Not all subjects are taught equally effectively with Internet resources, but many subjects would be easier to comprehend and more enjoyable to learn if online tools were employed, according to these students.

- **Students urge schools to increase significantly the *quality* of access to the Internet in schools.** Student use of the Internet at school is fraught with constraints and limitations that cripple the potential it has for educational good, these students contend. Certainly, not every student with whom we spoke attends a school with large numbers of Internet-connected computers. In fact, nearly all thought it a good idea to have more Internet-connected computers at school. Even those students who attend highly wired schools describe a school environment that often discouraged their use of the Internet. They are frustrated by their inability to go online at school. Many believe that these frustrations arose because teachers do not see educational value in providing abundant Internet access, or because of fears about inappropriate material on the Internet.

- **Students believe that professional development and technical assistance for teachers are crucial for effective integration of the Internet into curricula.** Students report that many of the Internet-based educational assignments they receive consist of little more than completing digitized worksheets. While some students offered examples of compelling online assignments that tapped their higher order thinking skills and took advantage of the rich, interactive elements of the Internet, they were far and away the exception. Most students freely offered up numerous examples of teacher-directed uses of the Internet for school that seemed to have dubious educational value. In this regard, it is interesting to note that students are

uniformly more interested in—and saw more value in—doing schoolwork that challenged and excited them than in simply using the Internet for its own sake.

- **Students maintain that schools should place priority on developing programs to teach keyboarding, computer, and Internet literacy skills.** Not all students have the skills and knowledge to navigate the Internet effectively. No matter what conventional wisdom may say, it was abundantly clear from conversations with focus group participants that even students who are frequently online could benefit from instruction and advice about how to use the Internet better. The students held many misconceptions about such basic things as how to use search engines, how computer viruses are contracted and spread, and how their privacy might be compromised online—just to cite a few examples. Students with better Internet skills and with greater knowledge of educational Web sites had a significant edge over other students. These students—and those students in our low-adopter groups—also reported that those who do not use the Internet much are often reluctant to go online because they do not even have basic keyboarding or computer skills (or—in more extreme cases—because they lack the basic reading and writing skills required of the online world).

- **Students urge that there be continued effort to ensure that high-quality online information to complete school assignments be freely available, easily accessible, and age-appropriate–without undue limitation on students' freedoms.** Even students with strong skills say that finding the right information on the Internet can be frustrating and time-consuming. Most students who spoke with us expressed frustration about finding quality information to help them complete their school assignments. Here are some of their complaints: Search engines regularly retrieve too many references for common Internet searches. Authorship of Web sites and timeliness of posted information is often not disclosed; the information on many Web sites can be biased or incomplete; and, the reading level of the best information may exceed the capabilities and comprehension of students. In addition, visitors to many sites that offer useful information for free are inundated with commercial advertisements, and trusted sources may charge fees for their information.

- **Students insist that policy makers take the "digital divide" seriously and that they begin to understand the more subtle inequities among teenagers that manifest themselves in differences in the quality of student Internet access and use.** The gap between students who do and don't have access to the Internet at home is a serious matter to these students. In the classroom, it is apparent to Internet-savvy students when a classmate does not have access to the Internet. Indeed, students with easy Internet access assert that they have a clear and persistent advantage over their peers with little or no access. Moreover, out of concern for those who do not have easy access to the Internet outside of school, students report that most of their teachers do not assign homework that encourages or requires student use of the Internet. While these students did not offer novel remedies, they did insist that policy makers and educators recognize the gap and take steps to address it.

Of course, student use of the Internet for school does not occur in a vacuum. Students' experiences, and those of their states, districts, schools, teachers, and parents, strongly affect the way the Internet is used for educational purposes. Indeed, while good schools of today are expected to have significant computer and Internet facilities, they face significant barriers to integrating it into their operations. Even when cost, technical, training and use, and equity matters have not been at issue, schools have faced legal, policy, and ethical tensions around whether and what type of access minors should have to the Internet. In such a chilled, or potentially chilled, environment, school leaders, teachers, and resource personnel have had good reason to be cautious about the kind of access they provide to students and about the extent to which they integrate the Internet into their curricula and instructional practices. The resultant Internet-use policies, filtering technologies, and human misgivings have all made adoption of the Internet challenging for educational institutions, teachers and students.

Nonetheless, students themselves are changing because of their use of and reliance on the Internet. They are coming to school with different expectations, different skills, and different resources. In fact, our most Internet-savvy students told us that their schools, teachers and peers are at times frustratingly illiterate, naïve, and even afraid of the online world. Indeed, students who rely on the Internet for school—who cannot conceive of not using it for their schoolwork—may ultimately force schools to change to better accommodate them. According to the students with whom we spoke, many schools have yet to react or even to recognize the changes in the ways that Internet-savvy students communicate and access information.

In the midst of other priorities, schools can choose to view this emerging pressure for change from their student body in either a positive or negative light. On the positive side, through the growing use of the Internet outside of school, educators have the opportunity to expand their reach and to engage students in new and thoughtful ways. On the negative side, the sanctity and tradition of the four walls of the classroom quite literally is melting away. Students are likely to be increasingly dissatisfied with conventional approaches to teaching and learning and to the limited resources available to them in all but the best-equipped schools. In the final analysis, schools would do well to heed the Latin writer Seneca's words, which ring as true today as when they were written nearly 2,000 years ago: "The fates guide those who go willingly; those who do not, they drag."

PART IV: APPENDICES

Student Sample and Data Collection Methods

This report is based on information gathered from public middle and high school students across the United States via two methods: focus groups (which included the administration of questionnaires to focus group participants) and the solicitation of online student-written stories.

Focus Group Sample and Methods

We conducted a total of 14 focus groups of students drawn from 36 different schools: 12 focus groups of heavy-Internet using students and 2 of low- or non-Internet using students. A total of 136 public middle and high school students—11 to 19 year olds—participated in focus groups run between the months of November 2001 and February 2002. The focus groups were held in the greater metropolitan areas of Washington, D.C., Detroit, Michigan, and San Diego, California. The sample of students was balanced by gender and school-level. Self-reports of students' race/ethnicity indicated that the overall student sample was 55% White, 26% Black or African-American, 13% Asian, and 6% Hispanic or Latino.

Students were intentionally selected into focus groups based on their self-reported use of the Internet. "Heavy Internet-using students" who made up the participants in 12 of our 14 focus groups were defined as students who used the Internet at school, spent at least five hours per week online, and who believed they used the Internet a lot. "Low-" or non-Internet using students who made up the participants in our other 2 groups did not meet one or more of these criteria.

Each group was moderated by the study co-authors in tandem, with assistance from a third researcher who operated a video camera, tape recorder, took notes, and otherwise helped manage the logistics and flow of the group. Focus groups lasted approximately two hours in duration and began with students completing a brief questionnaire. When possible, groups were also briefly divided by gender to probe gender-specific issues.

Solicitation of Online Student-Written Stories

During the months of February and March 2002, we held an online contest at www.air.org/yourstory that asked students in middle and high school to submit a story of at least 250 words in length detailing the many ways they or their friends use the Internet for school. Students were also asked to provide innovative ideas about how to use the Internet for school in the future. The Web site was advertised via organizations and individual email networks with great reach in education communities. We received nearly 200 online narrative submissions and over 50,000 hits to our Web site.

While not all storytellers disclosed personal information to allow us to characterize them, many did. Of those who did, it was not surprising to learn that they were not as diverse a group of students as our focus group participants. While our online storytellers were balanced by gender, the vast majority reported themselves as being White (85 percent) and in middle school (70 percent). Our online storytellers also reported being from 13 different states across the country, with the majority being from Midwestern or Southern states.

About the Authors

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Mr. Levin is a Senior Research Analyst specializing in national and international educational technology and e-learning policy issues for the American Institutes for Research in Washington, D.C. He played a key role in the development of the nation's first educational technology plan in 1996 and more recently led the development of the revision to that plan, *e-Learning: Putting a World-Class Education at the Fingertips of All Children*. He is the author, editor, and reviewer of numerous national and international studies and reports of distance education, teacher use of technology, and the availability and use of computers and the Internet in schools and classrooms. His work has been cited by the Congressional Web-based Education Commission, *Forbes*, *Education Week*, and other national publications and media. An alumnus of the Institute for Educational Leadership Policy Fellowship Program, Mr. Levin holds an A.B. in English from the College of William and Mary and an M.A. in Quantitative Sociology from the George Washington University.

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About the Pew Internet & American Life Project

The Pew Internet & American Life Project creates and funds original, academic-quality research that explores the impact of the Internet on children, families, communities, the workplace, schools, health care, and civic and political life. The project is an independent, nonpartisan organization fully funded by The Pew Charitable Trusts.

End Notes

[1] U.S. Department of Education, National Center for Education Statistics (2000a). *Internet Access in U.S. Public Schools and Classrooms: 1994-2000*, NCES 2001-071, by Anne Cattagni and Elizabeth Farris. Project Officer: Bernie Greene. Washington, DC. Available at: http://nces.ed.gov/pubs2001/2001071.pdf

[2] Unpublished Pew Internet Project survey of 2,501 Americans conducted between June 26 and July 26, 2002. The sample includes 1,527 Internet users. The margin of error for the entire sample is plus or minus two percentage points. For the Internet sample, the margin of error is plus or minus three percentage points.

[3] Pew Internet Project data from June 26-July 26 survey. Also, U.S. Department of Commerce, Economics and Statistics Administration, National Telecommunications and Information Administration (February 2002). *A Nation Online: How Americans Are Expanding Their Use of the Internet*. Washington, DC. Available at: http://www.ntia.doc.gov/ntiahome/dn/nationonline_020502.htm

[4] U.S. Department of Commerce (February 2002), *Ibid*.

[5] The Pew Internet & American Life Project (September 2001). *The Internet & Education: Findings of the Pew Internet & American Life Project*, by Amanda Lenhart, Maya Simon, and Mike Graziano. Washington, DC. Available at: http://www.pewinternet.org/reports/toc.asp?Report=39

[6] The Pew Internet & American Life Project (June 2001). *Teenage Life Online: The Rise of the Instant-Message Generation and the Internet's Impact on Friendships and Family Relationships*, by Amanda Lenhart, Lee Rainie, and Oliver Lewis. Washington, DC. Available at: http://www.pewinternet.org/reports/toc.asp?Report=36; U.S. Department of Commerce (February 2002), Ibid.

[7] Tapscott, D. (1998). *Growing Up Digital: The Rise of the Net Generation*. New York: McGraw-Hill.

[8] See, for example, reports of the Teaching, Learning, and Computing Study: 1998. Available at: http://www.crito.uci.edu/tlc/html/tlc_home.html; U.S. Department of Education, National Center for Education Statistics (2000a), *Ibid.*; U.S. Department of Education, National Center for Education Statistics (2000b). *Teacher's Tools for the 21st Century: A Report of Teachers' Use of Technology*, NCES 2000-102, by Becky Smerdon, Stephanie Cronen, Lawrence Lanahan, Jennifer Anderson, Nicholas Iannotti, and January Angeles. Project Officer: Bernie Greene. Washington, DC. Available at: http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2000102; Rockman *ET AL* and Grunwald Associates (2002). *Are We There Yet? Research and Guidelines on Schools' Use of the Internet*. Alexandria, VA: National School Boards Foundation. Available at: http://www.nsbf.org/thereyet/fulltext.htm

[9] See, for example: Grunwald Associates (2001). *Children, Families, and the Internet: 2000*. Burlingame, CA: Author.; Just Kids, Inc. (2002). *An Environmental Scan of Children's Interactive Media from 2000 to 2002*. New York: Markle Foundation; Knowledge Networks/Statistical Research (2002). *How Children Use Media Technology*. Westfield, NJ: Author.; Roban, W.,

Groppe, L., and Schilt, K. (2002). *The Net Effect: Girls and New Media*. New York: Girl Scout Research Institute.

[10] The Pew Internet & American Life Project (June 2001). *Teenage Life Online;* op. cit.

[11] The Pew Internet & American Life report (May 2002). *Use of the Internet at Major Life Moments.* Available at: http://www.pewinternet.org/reports/toc.asp?Report=58