Academic, Social, and Personal Uses of the Internet: Cases of Students from an Urban Latino Classroom

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Abstract
As more and more K-12 students gain access to the Internet at home and at school, the potential exists for students, families, and schools to use this resource in new ways. However, we know little about Internet use and perceptions by students and families from outside the middle class, mainstream U.S. culture. This study presents cases of four Latino middle school students from three families who gained home Internet access for the first time in connection with an educational technology project set in a public school in Detroit, Michigan. We asked how the students and their families perceived and used the Internet as a tool for education, recreation, and socializing. (Keywords: case studies, home technology, Internet, middle school, social context.)

In the last few years, more and more K-12 students have gained access to the Internet. As of September 1998, 85% of public schools in the United States had some sort of Internet connection, and Internet use in schools continues to increase (Education Week, 1998). As access from home increases as well (in 1998, approximately half of U.S. homes had computers, and a quarter of U.S. homes had Internet access; Schiesel, 1999), children in the United States have increasing opportunities to use the Internet in a variety of settings.

As an educational tool, the Internet appears to have great potential. Many educators have looked optimistically toward the Internet as an information source and way of connecting students, teachers, and parents (e.g., Garner & Gillingham, 1996; Owston, 1997; Panel on Educational Technology, 1997; Priel, 1996). However, we know little about how students and their families use the Internet, especially when the technology is newly introduced into the home. We need to know in much greater detail how students use new information technologies such as the Internet and, at least as important, how they perceive and value the new technologies.

Furthermore, computer and Internet use in the United States, both at home and school, has been far more available to middle- to upper-class European Americans, with much less participation from lower-income groups and cul-

The research reported in this article was made possible through the efforts of the Hi Ce research team, students from the University of Michigan School of Public Health, and the participating students, parents, teachers, and administrators. Rigo Gallegos and Rosario Carrillo were particularly essential to the completion of this article. Rigo also provided invaluable ideas and comments on drafts of this article, as did Ron Marx and Annemarie Palincsar. We also thank Joe Krajick and Elliott Soloway for their invaluable contributions to the curriculum and technology used in the LAB Project. The National Science Foundation and the University of Michigan provided funding for this research.
tural minorities (Ebo, 1998; Education Week, 1998; Wolf, 1998). Are the barriers to greater participation mainly economic, or do students from these groups have needs and desires that are very different from “mainstream” users? In other words, when economic barriers are lowered, are there still large differences in the value people find in computers and the Internet, based on culture or other situational factors (c.f. Hoffman, Novak, & Venkatesh, 1997)?

This study explores these issues in connection with an educational technology project set in a public school in Detroit, Michigan. At the beginning of 1998, Latino students in an English-as-a-second-language (ESL) science class at an urban middle school were loaned “NetTV” units—devices that allow connection to the Internet using a standard television set and phone line—for their homes and given free Internet service for one year. This was done in the context of an extended science unit titled Learning About Breathing (LAB). The primary rationale behind the distribution of NetTV units was to allow families to become more involved in their children’s schoolwork through homework assignments that used NetTV and through communication over the Internet. Families were also encouraged to use NetTV for other educational as well as recreational purposes. This study takes a close look at the use and perception of NetTV by four students from three families in order to understand the ways home Internet access came to relate to their academic, social, and personal lives.

The cases in this study have three overarching characteristics that set them within the context of the issues described above. First, they are cases of a new information technology—namely, a device to access the Internet—being introduced into the home. Second, the technology was introduced, at least in part, as a way of linking home and school; specifically, students were given assignments to do at home that used NetTV, and students, parents, and the teacher were encouraged to use e-mail to communicate with each other outside school. Third, the families involved were working class, Latino, and primarily Spanish speaking and, thus, demographically outside the “mainstream” of Internet and home computer users in the United States. (The demographic and curricular context of the LAB project is discussed in detail in the Methods section.)

Underlying this study is the broad question, What value did NetTV have for the students and their families? Answers to this question can help inform our thinking about the possibilities and constraints of using technology like NetTV for educational purposes.

RELATED RESEARCH

The following literature is examined around the three characteristics of the present study outlined above: adoption of new information technology into the home, use of communication technology as a link between home and school, and technology use by groups outside the European-American, middle- to upper-class majority. First, we look at studies about families using computers in their homes for the first time. (Although NetTV has different features from standard personal computers, NetTV’s function as a general-purpose information technology appliance allows a relevant comparison.) Second, we examine projects
that have attempted to connect home and school through the use of personal computers. Third, we explore the literature on equity of access to information technology, in general, and to computers and the Internet, in particular.

Adoption and Use of Personal Computers in the Home

Although personal computers have been in people's homes for two decades, the number of studies seeking to understand how computers are adopted and used by families is extremely limited. Only a handful of published studies have explored this topic in depth. Below we discuss what these studies have to say about the following issues relevant to this study: When presented with a new, flexible tool like a computer in the home, how do children and adults appropriate it? Who takes ownership of it, and for what uses? What factors seem to be important to the way this appropriation happens?

Venkatesh (1996) conducted a series of studies about computer home use in the mid- and late 1980s. The studies examined middle-class families during a time when home computing was a new idea, a situation similar to that of the families in this study. The families in these studies at first found it difficult to find a place for the computer in the home, both literally, in that they did not know if it should be placed in the living room, family room, bedroom, or somewhere else and figuratively, in that it did not fit clearly into the home context like a telephone or VCR. However, Venkatesh suggests that since that time, computers have become a much more accepted and important technology in the home. To conceptualize these trends, Venkatesh proposes an approach in which technology use is situated in the social context within which it is embedded and the functions it performs. To understand why a technological tool is used a certain way, it is not enough to investigate an individual interacting with the design and features of the tool; one must consider the social dynamics that surround users. This idea is a basic assumption of our study.

In set of studies of home computer use dubbed “HomeNet,” Kraut, Scherlis, Mukhopadhyay, Manning, & Kiesler (1996) reported a study of 48 families who were each given a computer, Internet access, and technical support for a little over a year. The studies found that many families had difficulty getting started despite having attended a training session, but individuals were more likely to learn to use the Internet if they had contact with more knowledgeable friends or family members. Having regular e-mail partners seemed to be the most important factor in whether people came back to the Internet regularly. Most important, the HomeNet studies found that household income and education were not correlated with Internet use, suggesting that, if economic barriers to access were removed, socioeconomic differences in Internet access would disappear.

Giacquinta, Bauer, and Levin (1993) studied families who were given home computers for the first time. Focusing specifically on academic and educational uses of computers, the authors proposed a model that attempted to include the most important personal and social factors that affect how much home computers are used for academic tasks. The authors found that there was, in fact, little academic or educational use of computers by the families studied; instead,
computers were used mostly for playing games. In explaining this, the authors point to the absence of social support, in particular parental encouragement, school emphasis on academic computing, peer pressure, and sibling support. Although there was some evidence that parents and teachers valued computer skills in themselves, the computer did not fit into the existing social structure of the family or school, except as a toy. The authors called for schools to change their expectations about children's use of computers both at home and at school and to create home–school relationships that would help schools actively support computer-enhanced learning opportunities at home.

Home–School Connections

There are several reports of using new information technology to link home, school, and community. Examples include the Buddy Project, which connected families and elementary schools in Indiana (North Central Regional Educational Laboratory, 1993); the Blacksburg Electronic Village project, which wired schools, homes, and the public library in Blacksburg, Virginia, and developed an extensive Web site for educational, civic, business, and entertainment purposes (Carroll & Rosson, 1996); and the MUSIC project, which involved a handful of residents in a low-income neighborhood in Boston (Shaw, 1996). However, only the Buddy Project has produced in-depth research about the effects of the project on the academic and family lives of students.

Evidence from case studies in the Buddy Project (McMahon, 1993) indicates that, for a few families, the computers were catalysts for increased parental involvement in students' homework. However, in general, parents did not gain a great deal of computer skill or use computers to communicate with teachers (McMahon; North Central Regional Educational Laboratory [NCREL], 1993). There is evidence, on the other hand, that parents in Buddy Project families tended to communicate more with teachers and other parents, but not online (McMahon). The computers served as a subject of, rather than a means for, communication. Another finding from the Buddy Project was that, despite increased student motivation for computer-based work, overall homework return rates were lower for Buddy students (83% vs. 94%) and lower within classes when homework was required to be done on the computer. The authors of the 1993 NCREL report speculated that this might be because the computer homework was more difficult overall, it could not be done during school free time, and technical problems with the computers.

Equity and Computers

Because computers and the Internet are widely perceived as having educational and economic value, it is not surprising that they have become the subject of debates over equity. In terms of participation in online activities, some have argued that the potential irrelevance of geographic location, along with the freedom from physically defined characteristics associated with bias, can lead to a more equitable society (McNutt, 1998). On the other hand, others have argued that the Internet is already accentuating rather than reducing class-based inequality (Ebo, 1998).
A key issue is access. In general, people with higher incomes and education levels have more information technology in their home, but for some technologies there seem to be differences among ethnic and racial groups, even when adjusted for income. For example, compared to European-Americans, a larger percentage of African Americans and Latinos are without basic telephone service; on the other hand, the percentages of households with cable TV and VCRs are similar for these three groups. In one study, Schement (1995) found that Hispanics' and Blacks have substantially lower rates of telephone access than Whites with similar incomes, for every income level under $40,000. This is particularly relevant because at present, most home access to the Internet is through a phone line, and it suggests that income is only one of many factors that potentially influence whether one has access to telecommunications technology. Local conditions can also affect technology access in idiosyncratic ways: talking with parents in inner-city Camden, New Jersey, Schement's group found that some intentionally rejected phone service as a way to keep their children away from the influence of gangs (Mueller & Schement, 1996).

Access to the Internet by race and ethnicity has not yet been studied this way, and the factors affecting access are certain to be even more complex than other information technologies. Even if one has a phone line, computers and Internet service cost money. Residents of affluent communities are more likely to have computer access available in schools, libraries, and workplaces. It is not surprising, then, that Internet users tend to be wealthier than average; a recent estimate put the median Internet user's family income at approximately $60,000, far above the U.S. median (Wolf, 1998). Internet users are also disproportionately European American and male; one study (Wolf) estimated that Internet users were 87% White (versus 74% in the general population) and 67.5% male. In this study, respondents identified as Hispanic, who represented approximately 10% of the U.S. population, made up just 3% of Internet users. Internet users also tend to be well educated: in 1996, 76% of Internet users had at least some college education, compared to approximately 45% in the general population.

Although less dramatic, inequity also exists in schools. Nationwide, students in high-poverty schools use computers less and have less access to the Internet: of the poorest schools (defined as schools where 70% or more of students are eligible for subsidized lunch), 52% reported that students use the Internet. In comparison, among schools with more affluent students, between 65% and 77% reported that students use the Internet (Education Week, 1998).

Language can be an additional barrier for some minorities. The majority of information and communication on the Internet is in English; while other languages do have a presence, the Internet is a much smaller place for those who are not fluent in English. Even beyond the language issue, some have argued that the Internet and

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1 The terms Latino or Hispanic are themselves problematic, as they do not refer to a clearly defined racial or ethnic group (Gimenez, 1997). In this article, the term Latino will be used to refer to the families in the study, all of whom had come from Mexico or Puerto Rico. When referring to other studies or statistics, however, the term used by the particular study will be preserved.
computers in general are dominated by an English-speaking, middle- to upper-class majority, to the exclusion of other groups (Selje & Selje, 1994).

**THEORETICAL APPROACHES**

Many studies of technology concentrate on the capabilities of the technology itself or how well users can approximate the designer's intentions when interacting with the technology (Kaptelinin, 1996; Nardi, 1996). However, researchers of technology and computer use have begun to argue that the way people use a particular technology is based not on intrinsic technological "affordances" alone, but on people's expectations, knowledge, and beliefs about the technology. MacKenzie (1996) has argued that the question is not of technologies being good or bad but good or bad for whom. "Different people may see a technology in different ways, attach different meanings to it, want different things from it, assess it differently" (MacKenzie, p. 6). Furthermore, Schement's research (Mueller & Schement, 1996; Schement, 1996) has suggested that these differences may be not broadly cultural, but largely local and personal.

MacKenzie's (1996) and Schement's (Mueller & Schement, 1996; Schement, 1996) work provide helpful perspectives on the way uses of technology are related to the tool itself and the social context, but neither directly address the ways technology can affect social contexts themselves. Bruce and Hogan's (1998) *ecological model* considers technologies to be "actors in social systems" (p. 271), embedded visibly or invisibly in the context of activities. New tools create new literacies, and these in turn can create new abilities and disabilities; when a tool (language, kind of literacy) becomes dominant, those who are skilled with that tool become privileged. Bruce and Hogan write, "we cannot simply choose our tools ... in order to be literate participants. Instead, technology chooses us; it marks us as full, marginal, or nonparticipating" (p. 271).

**METHODS**

**Project Setting**

The study took place in the context of a larger project that developed technology-enhanced curricula for middle school science classes in urban public schools, which began in January 1997. The class that is the context for our study was chosen to pilot a curriculum that involved home use of NetTV. One rationale for using NetTV rather than computers and modems was economic: a NetTV "box" was inexpensive compared to a computer, reducing the investment necessary for the pilot project and increasing the feasibility of expanding the program to more families in the future. A second rationale had to do with hopes about the way families would appropriate NetTV. Project designers speculated that, because the device needed to be connected to an ordinary television set, it would likely be placed in family "public areas" (such as a living room or family room), where family members could use it as an extension of their everyday recreational activities. If families became familiar with NetTV in this way, we reasoned, they would be more likely to use the technology for school-related and other educational tasks.
Participants

Parker School\textsuperscript{1}, a public middle school for students in sixth through eighth grade, sits at the edge of a Latino neighborhood in central Detroit. The neighborhood has escaped the devastation of some inner-city communities; there are few boarded-up houses or empty lots, and the main commercial street is filled with businesses. However, the average income level is low. In the ZIP code where most of the families lived, 55\% of families with children under 18 fell below the poverty line.

Students in this study were members of the English as a Second Language (ESL) II science class. This class was part of an ESL program that served approximately 60 students in the school. Similar to middle school ESL programs in California described by Valdes (1998), it was a "school-within-a-school"; that is, students tended to take all their classes within the ESL program, and they had little interaction with other students in the building. The program aimed to give students the English skills and subject-matter knowledge to eventually join "mainstream" classes. Science, math, and social studies were taught at two levels: ESL I (the most basic level) and ESL II. Spanish-speaking students were placed in ESL I, ESL II, or mainstream classes based on a home questionnaire and teacher recommendations.

The teacher of the ESL II science class, Mr. Ramirez, was fluent in both Spanish and English. For a year before the beginning of the LAB project, Mr. Ramirez had worked with faculty and graduate students from the University of Michigan enacting science curricula that embedded technology and was based on principles of project-based science (Blumenfeld et al., 1991; Krajcik et al., 1996).

Students transferred in and out of ESL II science throughout the year, mainly as a result of families moving in and out of the neighborhood. At any given time, there were between 18 and 24 students attending the class. The class was officially at the seventh-grade level, but students were placed in this class by language ability rather than age or academic criteria, and the class included students as young as 11 and as old as 14. The majority of the students in the class were from Mexico, with some from Puerto Rico. Most of the students had moved to the United States with their families within the past several years; for the most part, the parents spoke only Spanish. Parents ordinarily had little direct contact with school staff, and few official opportunities existed for visiting the school.

A large amount of technology was available to the Mr. Ramirez's students. One section of the school library was reserved for a set of 30 Internet-connected computers, and Mr. Ramirez held class there periodically throughout the year. During the LAB project, four NetTV units and phone lines were installed in Mr. Ramirez's classroom, which made it possible for the students to use NetTV during class and after school.

NetTV Technology, Distribution, and Support

The NetTV units, boxes about the size of a VCR, connected to a TV and a standard phone line. The units were controlled either by a handheld remote or

\textsuperscript{1} This name is a pseudonym, as are all names of students, family members, and teachers in this article.
by a remote keyboard. With NetTV, users could browse the World Wide Web, send and receive e-mail, and view television listings. A built-in modem was used to dial a local number that provided the Internet connection. Once connected, users could switch easily between television channels and Internet functions. NetTV used its own software, and no other software programs could be loaded onto the unit. Users could store e-mail and a list of "favorite" Web sites, but they could not save the content of Web sites in any other form or print.

In December 1997 and January 1998, the family of each student in the ESL II science class was offered a NetTV unit and a subscription to dial-up Internet services at no charge. Some students did not have telephone service in their homes and, therefore, did not receive a NetTV box; for those students, several NetTV boxes were made available in the classroom for use during class time and after school "tutoring time" on Tuesdays and Thursdays. An additional NetTV unit was available at a local social service clinic. Two students in the class were siblings and shared a single NetTV box. Thirteen families used NetTV boxes at home during the project. Families who received the NetTV boxes were visited by mentors from La Salud, a group of Spanish-speaking students from the University of Michigan's School of Public Health. La Salud mentors helped families set up the NetTV boxes and gave them an initial tour of its features. These same mentors kept in contact with families in person, through e-mail, and over the phone, to support their use of the devices and to aid in troubleshooting. In addition, one member of our research team carried a pager so that families could reach him if they were having technical trouble. (He was paged frequently in the early stages of the project.)

Parent meetings were scheduled three times during the project as a way to help parents understand the curriculum, support their use of NetTV, and encourage communication among parents and between the parents and the teacher. The initial meeting was attended by only one family, but by the third meeting attendance grew to include about half the families.

Curriculum

For one year before the beginning of the LAB Project, a team of researchers from the University of Michigan worked with seventh-grade science classes throughout Parker School, developing new curriculum units with a project-based science orientation (Blumenfeld et al., 1991). The units emphasized hands-on investigations based on themes relevant to students' lives. Though anatomy was part of the standard seventh-grade science sequence, the "breathing" theme of the LAB project was chosen because many of the students in Parker School, like many children living in urban settings, had asthma as a result of air pollution and other environmental factors. As a way to connect classroom activities with the outside world, a Spanish-speaking medical resident from a nearby clinic was enlisted to speak to the students in person, after which he was available to answer questions from students and parents through e-mail and an electronic message board. A member of the research team was often on hand to assist in the classroom and discuss the curriculum with the teacher.

Although a general curriculum outline was developed beforehand, specific activities were developed and modified as the unit went along. Researchers in-
volved in development of the curriculum met with the teacher during his planning period and on weekends to talk about the curriculum, and these researchers sometimes assisted with the teaching of the class. The LAB unit curriculum started in February and ran until the end of the school year, with four one-week breaks for vacations and standardized testing.

Two investigations were completed. "Measuring Your Breathing" asked students to measure their breathing and that of their family members before and after exercise. Breathing was measured in one of four ways: counting the number of breaths per minute, measuring the circumference of a balloon blown up with one breath, using a peak flow meter, and blowing into a solution of bromethyl blue while measuring how long it took to change color (bromethyl blue changes color when it comes in contact with a threshold amount of carbon dioxide).

Students and members of their families were instructed to do three trials each and enter the results onto a page on the LAB Web site. After data were entered, one could look at a graph comparing one's own family's data with the averages of others using the same measurement tool. Finally, students could post their conclusions on a shared message board. "Environmental Breathing Survey" asked students and their families to do a survey of their classroom and their home, focusing on environmental factors that could affect one's breathing. Students completed the survey by answering questions on the LAB Web site; when finished, they could see their scores compared graphically to the average for the class. Both investigations were followed up in class with worksheets and discussions.

The LAB Web site was developed by project staff for use by students and their families. Students could log into the site with their name and a password, and they could then follow links to several areas including investigation pages where they could post and share data; a list of educational, general interest, and entertainment sites in both Spanish and English; and a message board where they could ask questions about family health to a Spanish-speaking medical resident.

DATA SOURCES

Several data sources provided information about the students' and their families' perceptions of NetTV and subjective information about usage patterns. A primary source was structured interviews. In March 1998, each student was interviewed about their use of NetTV and other home technology. In December 1998, follow-up interviews were conducted at the homes of the three target families. Students and parents also spoke about NetTV during the parent meetings and during visits by research team members; these statements were recorded in field notes. Finally, students talked to each other about NetTV when using it in the classroom; conversations recorded on videotape provided supporting evidence of the students' perceptions about the technology. Interviews and conversations were conducted mainly in Spanish; project staff later translated these into English.

Several other data sources provided more direct information about each family's use of NetTV. Electronic logs from each unit indicated when and how much each unit was used and also provided some information about how it was
used. Researchers who visited families' homes also noted where the units were placed and who participated in the set up or troubleshooting of the units.

A record of the enactment of the LAB curriculum was created through classroom video and field notes of classroom activity. Although the curriculum itself is not the focus of this study, these data provided detailed background information of the classroom component of the LAB project.

**CREATION OF CASE STUDIES**

Because the approach here emphasizes individuals' goals and perceptions regarding NetTV, primary emphasis is placed on interviews as well as other statements recorded or noted at school or in the home. These statements were triangulated with evidence of NetTV activity recorded in computer log files, field notes from home and school, and excerpts of classroom video. Case studies were created to give an overview of each student's experiences with NetTV and the part NetTV played in each of their lives.

Target students and families were chosen who showed evidence of high involvement in NetTV early in the project. Jorge's unusual enthusiasm for NetTV caught our attention from the very beginning, and because his sister, Estella, was also in the class, they both became foci of our attention. In Alicia's case, her mother's curiosity toward NetTV and willingness to talk to us made her and her family an easy choice. Manuel was chosen because we noticed him spending a great deal of time after school using the NetTV units in the classroom.

The choice of "higher involvement" students rather than "average" students or a range of students was made to maintain a focus on the different ways students could find value in the technology. Barriers to greater use of NetTV in the LAB project have been discussed elsewhere (Fishman, Kupperman, & Soloway, 1999). In this study, we hoped that the higher involvement students could teach us why NetTV was of value to them and, by doing so, teach us something about the potential value of Internet access in homes that do not have it yet. The three families chosen for the case studies are different in many ways, and they represent a range of approaches to NetTV.

The structure of the case studies derives from the position that the value of a technology comes not from its technical capabilities alone, but also from how those capabilities are perceived in terms of the goals a person has and the social contexts in which that person exists. In this study, NetTV was a new tool with unclear possibilities for use. Students and their families adopted it to varying degrees; though it did not become a dominant technology for everyone, its place in their daily activities was in ongoing negotiation by the students, their parents, the teacher, and the researchers involved in the project.

The case studies will be presented to examine three broad categories of social contexts.

1. **Family life.** This category includes interactions with family members around NetTV, as well as norms and expectations created by parents and other family members. Because the NetTV technology was based in the home, there were many opportunities for it to enter into interactions within the family.
This, of course, includes using NetTV together, but, even without this sort of joint use, NetTV can enter into various family activity patterns. For example, NetTV might be part of issues such as who in the family gets privileged and who holds important knowledge. Clues about these issues can be found by observing what sort of expectations parents have about their children’s learning and what sorts of recreational activities are acceptable.

2. **School life.** This category includes assigned homework, in-class activities, and interactions with teachers and other LAB-project actors (such as mentors from the university) that involved the use of NetTV. NetTV was originally introduced in this context, and students had in-class and homework assignments that required the use of NetTV. As a new tool for doing schoolwork, NetTV had the potential to transform the ways students do school tasks and even the tasks themselves (c.f. Papert, 1993; Schofield, 1995). In addition, as Howard (1997) has observed, when network technology is used within a classroom community, it can be another site where students try to persuade the teacher that they are good students. Students’ perceptions about using NetTV for schoolwork, along with the schoolwork itself, provide evidence related to these issues.

3. **Kid life.** In addition to the two categories of activity above, NetTV played a part in the expressive and social activities that make up an adolescent’s personal life. Unlike tools such as textbooks or kitchen appliances, which have relatively clear and limited uses, NetTV is an enormously flexible tool for communication and information gathering—activities that take up an important part of a young person’s free time. When NetTV plays a role, these activities include prototypical uses of the Internet such as looking up a favorite movie star on the Web or exchanging e-mail “postcards” with friends, as well as things like talking with friends about a Web site one has seen or teaching a classmate how to access his e-mail. In this way, NetTV can enter into a student’s private social life, where expectations and norms are quite distinct from those of school or family. NetTV can be valuable in this context as a tool for developing social ties (e.g., by sending e-mail to friends), as a way to gain status by acquiring information valued by peers (e.g., facts about cool cars, etc.) or as a way to explore one’s own identity (e.g., by daydreaming about a favorite movie star).

**CASE STUDIES**

**Jorge and Estella Gomez**

**Family Life**

Jorge, 13, and Estella, 12, were both students in the ESL class. Their sister Paula, 11, went to the same school, but had been assessed as having good enough English skills to join the mainstream classes. There were two more siblings, Maria (9) and Junior (4). The household had at least two television sets; like many of the families in the neighborhood, the Gomez’s subscribed to cable TV, primarily to receive Spanish-language programs. The Gomez family connected the NetTV box to a television in a room that Jorge and Estella shared. Early on, when asked why the box was set up in the children’s bedroom rather
than a more central space like the living room, the parents replied that Jorge and Estella were the ones who would use it, so it belonged in their room. During the entire year, Mr. and Mrs. Gomez, in fact, never showed any evidence of using NetTV or even a curiosity about it. Mrs. Gomez said\(^1\) in the final interview that she was nervous about breaking it; at any rate, the parents never used it.

The children, though, were a different story. Jorge, Estella, and Paula all reported using NetTV often, sometimes with each other and sometimes alone, but never with their parents and never with their younger siblings. According to Jorge, Maria "preferred to be on the phone all the time," and Junior was too young to do anything but bang on the keys. Whenever there was a technical problem with the box—and there were many—Jorge would page a member of the research team acting as support staff; invariably, Jorge would talk with him on the phone. Jorge paged the researcher several times and took charge every time a problem came up.

The Gomez children logged a total of 107 hours during the first four months they had NetTV, more than any other family. Even considering that they were the only family with two children participating in the LAB project, it is reasonable to say that NetTV was used a particularly large amount by the children. They claimed to use NetTV every day, and the logs show that indeed there were only a few days when their unit was not used. There was at least a little competition between Jorge and Estella for use of NetTV: early on, the parents set up a rule that each could have it to themselves for an hour a day. Even so, Estella complained that Jorge did not let her use it a "fair" amount of time.

School Life

Jorge and Estella were both straight-A students. Jorge in particular was a diligent student: in a class where most students felt relatively little academic pressure, he did his homework on time and precisely, and he was constantly worried about "doing it right." Except when schoolwork was involved, Jorge interacted little with his classmates during school, and he seemed more comfortable talking with adults than with his peers. Estella was also shy, but she was less intense about schoolwork, and she had at least one good friend in the class, Linda.

Jorge quickly became an expert on how to use NetTV, even discovering things the university staff did not know. In January, he paged a project support staff researcher to let him know he had solved a problem he had been having with his password by deleting his old user ID and making a new one. The researcher was impressed. "I was just trying a lot of things, and this worked," Jorge told him. Later Jorge reported going to two classmates' houses and helping each of them use NetTV. This was, he later told us, the first time classmates had asked him for help other than simply asking what a homework assignment was.

Jorge helped his peers, but most of his e-mail messages were to and from adults. He sent repeated e-mail messages to Mr. Ramirez, members of the research team, and the La Salud student who initially set up his box. He even wrote his reading teacher when he found out she had e-mail as well. He wrote

\(^1\) Unless otherwise noted, all statements attributed to students and family members are English translations from Spanish. Translations were done by members of the research team.
to these adults (who all were Spanish literate) in English as much as he could, explaining that "the teachers prefer it in English."

Jorge was always one of the first to do his homework when there was an assignment using NetTV, and he took pains to make sure his work was recognized, including e-mailing Mr. Ramirez or project staff to ask for help or simply to let them know he had finished. He was quite nervous about doing something wrong: at one point he realized he had entered his conclusion for an investigation under the wrong name, and despite assurance from the teacher and helpers that he did not have to redo his work, he was not satisfied until he had gone back and done the assignment the "correct" way.

It did not surprise us, then, when Jorge said he liked doing homework on NetTV, but his reasons were quite interesting. In the March interview, Jorge said he preferred to do homework on NetTV compared to doing it on paper, because "on paper we have to do many investigations. On the box we just enter what it asks for." Homework on NetTV, to Jorge's mind, was more constrained, with less chance for ambiguity and, therefore, could be done with confidence, speed, and little risk. Jorge's second reason for preferring homework on NetTV also had to do with risk. For writing assignments, he said that he would rather do it on NetTV because "if you do it on paper you can lose it. On the box nobody can erase it." Several other students said they were put off by the extra effort needed to type an assignment online compared to writing it by hand, but Jorge was facile with the technology, and perhaps any extra effort was offset by what he perceived as a reduction in risk of losing his work.

Estella was also a top student, and she used NetTV extensively, though evidently not to the extent Jorge did. Like Jorge, Estella wrote e-mail messages to the teacher, classroom helpers, and the La Salud student, but she wrote fewer messages to adults. Estella was not as anxious as Jorge to do her homework, but she did all the NetTV assignments and apparently enjoyed them. Her stated reason for preferring NetTV assignments echoed one of Jorge's: "It is all set up," she told us. "You just have to enter numbers, not write a lot." In school, when NetTV was used in class for group work, Estella always quietly dominated the group. She was good at typing, and she was always first at the keyboard, giving up the position reluctantly.

For both Estella and Jorge, academic use of NetTV was not limited to the LAB project. Along with several others from the ESL II science class, Estella and Jorge took reading with Mrs. Black, who had her own e-mail account independent from this project. According to Estella and Jorge, Mrs. Black encouraged them to e-mail her and to use the Internet to look for information relevant to class assignments. By the end of the school year, Estella and Jorge told us, they had used NetTV instead of going to the library to look for information. In particular, when they had an assignment in Mrs. Black's class to look something up in the newspaper, they would go to the Free Press or USA Today Web sites, which Mrs. Black had told them about.

**Kid Life**

It is impossible to know all the sites the Gomez children went to while surfing, but the URLs that show up in their log tend to be TV related, including...
sites sponsored by kid-oriented TV shows (e.g., *Rugrats*), popular Latino entertainers (e.g., Carlos Ponce), or TV stations popular with children and young adults (e.g., Detroit Channel 20). They also visited Web sites for various consumer products (e.g., Doritos). Jorge confirmed for us that he and Estella would write down URLs that appeared on TV. According to Jorge, he would go back repeatedly to sites that had “kids' clubs” or that offered prize drawings and contests. Estella and Paula tended to visit Web sites of entertainers and would return to the sites to look at the pictures again and again.

There is evidence that e-mail also had entertainment value for the Gomez children, especially Estella. Although Estella did not send as many e-mail messages to teachers as Jorge did, she used e-mail to communicate regularly with her friend, Linda, and even discovered how to send an e-mail “postcard” through a World Wide Web site. Estella kept up a regular exchange of e-mail messages and “postcards” with her friend and classmate Linda, continuing this exchange into the summer. Why send e-mail to a friend she saw every day, who she could easily call on the phone? To this question Estella answered simply, “it’s fun.” Jorge also reported checking his e-mail, and he told us that he sent e-mail to at least two classmates, but these messages seem to have been unreciprocated.

**Summary**

Jorge and Estella’s use of NetTV spanned academic and recreational uses. Both Estella and Jorge found ways to use NetTV academically outside the LAB curriculum. They each communicated with Mrs. Black through e-mail and even used the Web to search for newspaper articles. Somehow, the value of NetTV for academic work became quickly apparent for them. Entertainment and social uses were not lost on the Gomez children, either. Advertisements of Web sites related to their favorite entertainment sources—cartoons and Latino pop stars—became an entry point to Web locations visited again and again. E-mail allowed Jorge special access to school-related adults, while for Estella, e-mail was a way to communicate with a good friend.

Jorge clearly liked NetTV. When project staff went to pick up the NetTV unit from the Gomez house for the last time, Jorge had been using it up to the last minute and was visibly unhappy at having to give it up. We have some clues as to why Jorge valued NetTV as he did, though these explanations must remain tentative. Jorge was a skillful user of the technology, and he was—perhaps for the first time—in a position of being an expert in relation to his peers and even his teachers. Jorge was also concerned about doing his homework “correctly”; despite problems with the technology, Jorge seemed to consider NetTV a particularly “safe” way of completing his assignments. Perhaps he felt more in control of his work on NetTV than on paper-and-pencil assignments. We cannot know exactly what Jorge’s motivation behind his numerous e-mails to his teachers, but it may have been a way to press adults to recognize that he was a “good student.” Estella was clearly not as intense about NetTV as was Jorge, but her extended e-mail exchange with Linda, while a standard use of the Inter-
net in general, was unusual among students in the LAB project. We do not know exactly how much e-mail was exchanged between Estella and Linda or exactly what messages were exchanged between them, but it was important enough that Estella mentioned it at several different points in time.

The activity by the children is even more striking in contrast to the parents’ hands-off stance toward NetTV. Far from becoming a way of increasing parental involvement in schoolwork, in the Gomez family, NetTV was entirely in the children’s domain.

Alicia Valdés

Family Life

The Valdés family owned a standard set of home entertainment technology: television, VCR, stereo, and cable television for the Spanish-language channel. Alicia was mature for her age, and she studied hard at school. Besides Alicia, two younger brothers lived in the house.

Our interactions with Mr. Valdés were generally brief; typically, when a researcher visited the Valdés home, Mr. Valdés would give a warm greeting, apologize that he had not had time to use NetTV, and then retreat into another room.

Mrs. Valdés, on the other hand, talked with us extensively. She was a strong and consistent advocate of her children’s education, and her expectations for her children were high. This extended to their use of NetTV. She was also the most vocal and communicative parent in the class; she was the only parent to attend the parent meeting held in mid-March; in that and subsequent meetings she made her opinions clear, asked questions, and called on other parents to become more involved. From the beginning, she saw NetTV as a way for her children to get an educational advantage. She saw it as more than a device for Alicia to do her homework on, though. Although Alicia got straight A’s, it was Alicia’s younger brother Felipe who Mrs. Valdés called the “genius” of the family; although Felipe was not in the ESL II class, Mrs. Valdés concerned herself with finding ways that NetTV could help Felipe get ahead.

At first, academic use of NetTV was an exclusive priority. In March, the unit was placed in Alicia’s room, and the other children were told to stay away from it, because it was “for Alicia’s homework.” Mrs. Valdés also stayed away from the keyboard at first, but by April, she overcame her initial nervousness and began to use it herself, searching for educational sites for Felipe and e-mailing project staff for help. Gradually, Mrs. Valdés began to try different, non-academic uses of NetTV. In May, they discovered that the NetTV unit could be used as a speakerphone; not realizing that free worldwide access did not extend to the speakerphone calls, they made several long-distance calls to relatives in Mexico. (The LAB project ultimately took responsibility for the phone charges.) In the fall, they tried several times to e-mail another relative in Mexico, but the message did not seem to go through. Despite these failures, Mrs. Valdés gradually became comfortable with using NetTV and concluded that it was “worth having.”
School Life

As described above, NetTV was at first considered to be a tool for Alicia's homework and, soon afterward, a way for Eelipe to find information for his own school assignments. Mrs. Valdez, Alicia, and Felipe reported doing the online curriculum investigations together. However, Alicia herself did not see NetTV as a particularly advantageous way to do schoolwork. She did all her NetTV assignments, but she was not particularly enthusiastic about NetTV as a way to do homework, saying, “I usually like it, but sometimes I get frustrated and don’t like it because it’s too slow or I don’t understand.” Overall, she preferred doing her homework on paper, saying “it’s faster and easier” that way. (Five of Alicia’s 13 classmates who also were interviewed shared her preference for doing homework on paper.) Alicia even perceived NetTV to be a threat to completing her schoolwork: when the box malfunctioned, she was worried that her grade would suffer. Like Jorge, she thought of NetTV’s role in the online homework assignments in terms of efficiency; unlike Jorge, she did not find NetTV to be an efficient way of doing homework. Nevertheless, she was a skillful user of NetTV, often doing the typing while Mrs. Valdez and Felipe watched; in class, other students came to her for help using NetTV and computers in general.

Mrs. Valdez wished her children to use the Internet as a giant library or encyclopedia, where Alicia and especially Felipe could find information about the topics they were studying in school. At the first meeting, we spent time with her trying to answer Felipe’s homework question, which was to find Michigan’s state flower. “I know we can look this up on the Internet,” Mrs. Valdez said, though she did not know how. We did not find this information on that day, but Mrs. Valdez persisted in trying to find educational material on the Web. Mrs. Valdez and her children tried various methods with mixed success; they often found something close, she told us, but never exactly what they were looking for. After trying and abandoning search engines, “as a last resort,” they began entering topic words as the middle part of a URL, a technique that was often successful when the topic was an artista (or entertainer, e.g., www.carlosponce.com) or commercial product, but nearly useless when the topic was symbiosis or manatee. They were more successful with URLs they learned from others: in mid-April, the log records nearly an hour online, with visits to www.encyclopedia.com and www.homeworkheaven.com, which had been mentioned in a project newsletter; they eventually found information on the manatee from a URL found by project staff after they asked him for help.

Ultimately, however, Mrs. Valdez wished for a computer that could run a CD-ROM encyclopedia. At the end of the year, it still was not clear if Mrs. Valdez, not to mention Alicia, had a good idea of what the differences were between information on the Internet and information in an electronic encyclopedia. Mrs. Valdez was also frustrated at the inability of NetTV to make hardcopy printouts, save information, or function as a word processor. In the end, she would have preferred to have a “regular computer.”
Kid Life

For Alicia, the entertainment and social potentials of NetTV did not seem to be very compelling. Beginning in March, she did spend some time visiting the artista sites, and she soon learned that typing in a URL based on a performer’s name (e.g., “www.enriqueinglesias.com”) often took one to a site for that performer. The content of these sites, Alicia told us, would sometimes become a topic of conversation among her friends. Still, visits to these sites remained relatively infrequent.

E-mail also did not seem to hold a particularly great attraction for Alicia. Though she e-mailed Estella a few times, the total number was small, and she did not continue once school was over. E-mail to one of the LAB research team who had been assisting in the classroom continued through the summer, but again, only sporadically. Felipe had no friends or teachers with e-mail, so he never used it.

Summary

As is clear from the descriptions above, in the Valdez family, Mrs. Valdez dominated the dialogue with us about NetTV, and Alicia’s use was heavily influenced by her mother’s wishes and urgings. It is difficult to tell, in fact, what Alicia’s attitude toward NetTV was. We know that she did not go out of her way to use it extensively; for the first part of the year at least, the Valdez family’s activity using NetTV was below the class median. On the other hand, she was skillful at typing and controlling the NetTV unit, and it is possible that she felt valued by her mother and her classmates for these skills.

Despite the absence of Mr. Valdez from NetTV activities, the Valdez family did the online investigations together as a family; as a family they explored other educational sites on the Web. Mrs. Valdez had always been involved in her children’s schoolwork, but she reported that the Internet gave her an added interest and gave her more resources with which to help her children educationally.

The Valdez family had much less success with NetTV as a communication tool. They may have seen its potential value for communication, since they tried at least once to send e-mail to relatives in Mexico, and they even used the speakerphone function. But these attempts failed in one way or another and were not repeated. Surprisingly, although Mrs. Valdez was vocal at parent meetings, she never attempted to e-mail other parents or the teacher. Alicia, too, never became particularly enthusiastic about e-mail.

Manuel Martinez

Family Life

Manuel lived with two brothers on the second floor of a large house divided into two apartments. They set up the NetTV unit in the living room, which consisted mainly of a television with cable TV, a VCR, a Nintendo game system, and a large couch. Elsewhere in the house was another television set, another VCR, and a stereo system.
Manuel reported using NetTV together with his brothers, sometimes joined by their father, who shared their taste in movies and cars. Mr. Martinez mentioned going to the Disney Web site with his sons, for example, to find out about recent movies. Mrs. Martinez, on the other hand, occasionally watched, but never joined in. The participation of Manuel's father in NetTV activity was unusual in the LAB project: only one other student reported that his father used NetTV. Mr. Martinez was also one of a handful of parents who reported using NetTV for his own interests. He found a site for a Mexican newspaper by using a search engine, and several times he went to URLs he read in car dealer magazines. He would try to follow links from these sites, but, he said, English was often a barrier. Overall, Mr. Martinez's personal use of NetTV was limited, though he wished for more news sites in Spanish, including local news. (For Manuel, on the other hand, language did not seem to be a barrier. His English was quite good; it was good enough, in fact, that he was placed into mainstream [non-ESL] classes in the fall of 1998.)

School Life
At school, Manuel had a nonchalant attitude, was not a troublemaker, but was careful about his image. He was a "B" student, did his science homework regularly, and finished the 1997–1998 school year with honors for academic achievement and citizenship.

Manuel told us he seldom used NetTV at home for homework, explaining that the unit did not work consistently. Instead, he would do his homework from a NetTV unit at school. On several occasions, he had looked up information for his social studies class on the Internet, but always, he said, he would use a computer in the school library or computer lab. As for e-mail, Manuel said he e-mailed the teacher once to get a homework assignment he forgot to write down, but otherwise never used it. Mr. Martinez also said he tried once to e-mail the teacher, but he "couldn't get it to work." Although Mr. Martinez used NetTV recreationally with Manuel, they did not do the online investigations or other homework together. The parents said that in general they did not have much time during the week to help their children with schoolwork; Mr. Martinez worked a 4 P.M. to 4 A.M. shift, and Mrs. Martinez worked during the day. Between this and Manuel doing his homework at school, it appears that the Martinez's NetTV unit was virtually never used for educational purposes.

Kid Life
Manuel's use of NetTV seemed to consist mainly of going to entertainment sites. Though he never used e-mail, he knew the URLs for a few favorite sites from memory and could type them in quickly at home or at school. These sites included a pro-wrestling site, the Cartoon Channel, the Nintendo site, and especially Lowrider Magazine. Manuel went to the Lowrider Magazine site at least a dozen times in the first four months of 1998. He told us that he had learned about the site from a classmate and went back again and again mainly to look at the photos of custom cars.

Manuel soon became one of the class "experts" on NetTV, so much that even Jorge Gomez came to him for help. He knew about both setting up the NetTV
equipment and how to get to "cool" Web sites; like Jorge, this seems to have given him status among his peers. Unlike Jorge, however, Manuel was apparently unconcerned with having a "good student" image; on the contrary, NetTV may have been a way to push the limits of authority.

At a visit in February, La Salud students talked with Manuel, his brothers, and his father. They said they had been looking up cars and sports, and they added that Manuel had been to a site "he shouldn't have seen." The brothers laughed about it, and the father seemed to not be concerned. Later it became apparent that Manuel had come across the Playboy Web site. In his family, this was a matter of teasing and minor embarrassment, but among his peers, it seems to have become a small point of pride. We saw this in a classroom interaction in mid-March involving Manuel and Estella, Julio and Ricardo (two other students in their group), and Estella's friend Linda. The students were working in groups, ostensibly making sure that everyone in the group had entered their data for the first LAB project investigation. The boys start talking about girls, and the topic of Playboy comes up. At this point, Manuel asserts [the dialogue below is a translation from Spanish]:

Manuel: I went to that page.

Not to be outdone, Julio replies: I went there, too. Ask my brother.

Estella looks mildly shocked. She asks Manuel: What came up? What came up?

Manuel replies vaguely: "A lot of stuff," and then insinuates that Estella has done it too.

Estella flatly denies this, implying that such an insinuation is an attack on her character: Don't lie, I don't do that, I'm not you.

But Manuel has caught the attention of the other boys. Ricardo asks: You can do that? How did you do that?

Manuel gives another vague answer, and Estella challenges Manuel again: People at the university are watching [what you do].

To which Manuel replies defiantly: I can watch what I want.

Later, Linda comes over to the group to talk to Estella, and the topic returns to taboo sites. Linda says that she had "put in" something.

Estella seems disappointed in her friend, and says: I didn't think you were like these guys.

But the boys ask her what she put in. Noticing Estella's reaction, Linda hedges, minimizing the extent of her "transgression": Entertainers ("Artistas"). I just put it in to see what was there.
In these exchanges, Manuel used his knowledge of the Internet to portray himself as bold, adult-like, and unafraid to challenge authority. Though we have little data besides this segment that recorded what students said to each other regarding NetTV, this exchange suggests that what they did or did not do on the Internet could be part of the way the students defined themselves and each other. With easy access to a broad range of media, including adult-oriented media, NetTV may provide an opportunity to explore not only one’s interests but also one’s social identity.

DISCUSSION

These case studies have tried to answer basic questions about the ways four students from an urban ESL classroom perceived and adopted home Internet technology. Apart from being able to complete required school assignments, did they and their families find any value in it, educationally or otherwise? For them (as opposed to the teacher or the LAB project planners), what was the value of NetTV?

Most of the uses of NetTV that were valued were quite close to ordinary, low-tech activities: looking at pictures of cars or youth idols, sending notes to classmates, looking for an encyclopedia article or newspaper article for a homework assignment, or reading about consumer goods. The “new” types of social and educational activity touted by Internet advocates—such as communicating with a geographically diverse special interest community; accessing current, original sources of data; and “publishing” one’s own information—were virtually absent in this study. The target students did not join chat rooms or bulletin boards, they seldom found information that was unique to the Web, and none created a personal home page. The limitations of the NetTV technology, the small scope of the project, and the students’ lack of knowledge about the possibilities of the Internet all may have contributed to this conservative use. NetTV did not make it easy to use more dynamic features of the Internet such as chat rooms, and it was impossible to create and upload a homepage with NetTV, even if one knew how. With few friends or relatives who had access to the Internet outside the LAB project, e-mail and other forms of Internet communication may not have been very compelling. Given more time, the LAB students may have discovered more of the Internet’s attractions, but with the possible exception of Jorge, at the end of one year, “Internet fever” had not taken hold.

Jorge, Estella, Alicia, and Manuel were different kinds of students, with different personal and social lives. They appropriated NetTV in individual ways that fit their personalities and their place in their families and peer groups. Far from looking solely to the classroom teacher or the research team to define the value of NetTV, each student brought, or quickly formed, ideas of what NetTV was good for. Below are some overall themes organized around the family/school/kid life framework.

Family Life Themes

Each of the three families in this study adopted NetTV differently. Although we anticipated that family recreational use of NetTV would precede and
"soften" a transition to academic and other educational use, none of these three families fit that pattern exactly. In the Valdez family, the pattern was the opposite: academic and educational use by Alicia and Felipe came first, and it was only later that Alicia began to look up entertainment Web sites and Mrs. Valdez attempted to use NetTV to communicate with relatives in Mexico. The Martinez family was one of the few families in the LAB project where a parent used NetTV recreationally with the student, but this apparently never led to any academic or educational use of NetTV in the Martinez home. The Gomez children used NetTV extensively for academics and entertainment; even after a year, both parents were completely uninvolved.

The cases in this study are consistent with previous studies (e.g., Kraut et al., 1996), which found that children often take the lead in using computers. In this study, the children were by far the most skilled with NetTV. However, where earlier research found that the heaviest user often "pulled along" other members of the family, in these three families, there were three very different patterns of NetTV use. In the Valdez family, the mother was a primary force in expanding the family's use of NetTV, though she was reluctant at first to use the technology herself. In the Martinez family, the father joined his sons in recreational use of NetTV and used it himself to a limited extent, while the mother remained apprehensive about using NetTV herself. In the Gomez family, the children appropriated NetTV into their own world, with no interaction from the parents.

It is not surprising that family use of NetTV did not follow a single pattern: each of the parents had different ways of interacting with the children for recreation and support of schoolwork. Before we can understand how a family adopts NetTV, we need to know how members of that family interact in general.

School Life Themes

Computers and the Internet have the potential to be part of a transformation of students' school tasks (e.g., Papert, 1993; Schofield, 1995), but we saw little evidence of this happening in the LAB project. Original plans included activities where students shared data and responded to each other's conclusions from home, but enactment difficulties led to these activities being stripped down until they were simply traditional assignments that happened online. In the LAB project, though the teacher talked to the class several times about the general value of the Internet, in terms of actual class work, NetTV assignments ended up being little different from those done with paper and pencil.

Accordingly, the students' reasons for liking or disliking NetTV were generally based on how much it helped them complete their assignments efficiently. For Jorge in particular, NetTV was perceived as a good tool for doing schoolwork. In Jorge's eyes, NetTV simplified the assignments and eliminated the risk of losing an assignment before it could be turned in. In addition, e-mail provided a way for Jorge to gain extra attention from his teachers; it may also have been a way to show them he was a "good student," working hard and using English as much as possible. For Alicia, on the other hand, NetTV was simply an extra layer of difficulty. When she had trouble with her box, she worried that
her grade would suffer. It was Alicia’s mother, rather than Alicia herself, who saw the potential value of the Internet as a source of academic information that could help her children get ahead educationally.

Despite the limited effect of NetTV on the students’ schoolwork, some uses by the target students provide hope that home access to the Internet could potentially be a useful part of students academic lives. Estella and Jorge used e-mail as a secondary means of communication with their teachers. They were also able to use the Web instead of a library, at least for looking up newspaper articles. The Valdez family, too, looked to the Web as an information resource. Large questions, however, remain: What would happen if all the students e-mailed their teacher as Jorge and Estella did? What are the conditions that make searching for information on the Web successful? E-mail communication between teachers and students and information seeking on the Web are important topics of study in themselves (Bruce & Rubin, 1993; Palmquist, 1993; Wallace, Kupperman, Krajcik, & Soloway, 2000).

Kid Life Themes

NetTV could be both the context and the subject of social activities among peers. Social activity was of three general types:

1. helping each other with the technical aspects of NetTV,
2. using e-mail to communicate with each other, and
3. viewing and sharing the content of Web sites.

Jorge, Estella, Alicia, and Manuel quickly became skilled with using NetTV, and from our observations and their own accounts, other students turned to them for help using the technology. We do not know enough about the students’ prior interpersonal relationships to say if and how they changed, but if Bruce and Hogan (1998) are correct that technology can create new social contexts, it is worth exploring how technology like NetTV can change social relationships among peers. We also do not have a good conception of why these four students became “NetTV experts.” Giacquinta et al. (1993) argue that peer networking is an important part of computer use; though we know that the four target students interacted at least a little, we do not have good information about the content of these interactions.

Through e-mail, NetTV could also be used directly as a tool for peer social interaction, though few of the students in this study used it this way. Estella was one of the few students in her class who did communicate with peers using e-mail; she and her friend Linda sent messages and even electronic “greeting cards” to each other, despite the fact that they saw each other in school every day. Estella’s stated reason for communicating with her friend this way (“it’s fun”) raises more questions than it answers. What exactly is fun about exchanging e-mail? What did they say to each other?

Finally, an important use of NetTV for the students had to do with visiting entertainment Web sites. We saw Jorge, Estella, and especially Manuel returning to favorite sites again and again. In contrast to the HomeNet study (Kraut
et al., 1996), where e-mail use seemed to “pull along” Web use, no such generalization can be made for these case studies. At one extreme, Manuel visited his favorite Web sites repeatedly despite a near absence of e-mail activity. For these students, going to a Web site may have been more like listening to a record or looking at a poster than reading a newspaper or watching TV. We saw evidence of these sites beginning to be part of the shared media experiences of the students in the LAB project. Certainly, as in the conversation reported in Manuel’s case study, the content of the Internet can become the subject of intense peer discussion. More investigation is needed on how children perceive and use favorite Web sites.

Language and Culture

Looking across these case studies, it is impossible to make neat generalizations about urban Latino families as Internet users. Instead, as Schement’s work (Mueller & Schement, 1996; Schement, 1996) would suggest, the case studies support the notion that local factors, down to the personal and family level, may be decisive influences on patterns of technology use. Overall, most of the behaviors observed in this study were observed in some form in the studies of early computer adoption in middle-class families, outlined in the literature review.

This is not to say that ethnic culture or socioeconomic status had nothing to do with the way the students and their families used NetTV; rather, these factors played out in different ways in different families. For example, in the Martinez family, the parents’ work schedule limited the time they could spend using NetTV with their children. A relative dearth of Web sites in Spanish was mentioned by Mr. Martinez; it is hard to know how much language and content was a factor for the other parents. These issues may be more of an issue for parents than for their children; none of the students mentioned language as a primary factor in deciding whether to use NetTV.

LIMITATIONS AND FUTURE DIRECTIONS

This study attempted to explore the value of NetTV to four students and their families who used it in various places and at a variety of times. Despite the broad sample of data collected from the LAB project, we were able to directly observe only a tiny fraction of the time the students and families were actually using NetTV. Much of our evidence came indirectly through self-reports in interviews or computer logs that provided only limited information. Except for a few conversations caught on classroom video, we know little about what conversations went on about NetTV between students and within families. As a result, this study presents some hints about how NetTV was used, but explanations must remain tentative. A second limitation was the time span of the study. A year is not a long time to adopt a new technology (Hewitt, 1998). It is probably safe to say that the study ended before we were able to see “mature” integration of NetTV into the students lives. Related to this, the technology itself must be considered a limitation. NetTV units were generally unreliable and not terribly easy to use. Arguably, the particular brand of NetTV used in this study.
was not a fair test of home Internet technology. Finally, the influence of the curriculum, teacher, and research team is hard to gauge. The teacher and research team certainly played a role in shaping the participants' perceptions about NetTV and the Internet in general, but aside from the assigned online investigations, it is difficult to know how these influences played out. As a curriculum unit, the LAB project had many problems, some inevitable in a first trial of new curriculum and technology and some specific to the particular teacher, class, and school. As a result, the potential value of home Internet access as a support for academic learning did not get a fair test.

There is much room for further inquiry into the issues touched on in this study. One area has to do with culture and the Internet. Over time, do users who speak a different first language or are members of minority cultures find less value in the Internet because of the dominance of European-American, middle- to upper-class, English-language culture? Or do they find a comfortable space? If so, how do they find this space?

Related to this are questions about the specific culture of classrooms, families, and communities. How does Internet use change the way time is spent in the classroom and at home? How do social relationships and power structures change in these places? This study did not have enough baseline data to explore these questions fruitfully. And though this study looked a little at how knowledge and skills about NetTV spread among the students, one could ask a much broader question about how knowledge and skills about a new technology spread across a community.

Then there are questions about learning. Further development and enactment of curricula that includes home Internet access is necessary to answer questions such as: What can students gain educationally by using the Internet to communicate with classmates, teachers, and people outside the community? How can the information resources of the Internet become part of children's homework? How can technology support more parent involvement in their children's schoolwork? What sorts of incidental learning can happen when the same tools are used for academic work and entertainment?

Finally, there are questions about the value of set-top Internet devices compared to standard personal computers. In this study, at least some users indicated that they found NetTV limiting and preferred a standard computer. Technology, of course, changes at such a fast rate that comparisons of specific brands or models only has momentary utility. However, needs of families and students do not change as fast, and a better conception of what they find valuable and desirable over the long term can help us choose technology more effectively. This article, we hope, is a step in that direction.

Contributors

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