

WIRELESS TECHNOLOGY PROSPECTS FOR INNER-CITY YOUTH
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The impact of wireless technology not only changed communication, but also the workplace, personal productivity, finances and politics. Yet the impact is still to reach populations already on the margins; the working poor, inner-city and rural communities, the computer illiterate, and immigrants, for example. This essay relates wireless technology to the gap known as the digital divide and inner city youth who are falling father behind in access to emerging technologies.

In June 2001, Palm Inc. announced that its charitable foundation called the Palm Education Pioneer (PEP) Program had made a total of \$2.3 million in grants to K-12 schools and colleges across the United States. At that time, the headline sparked my curiosity since I had been involved in writing a technology grant that would have developed leadership and technical capacity among inner-city youth at a community center near downtown Los Angeles. I set out to review the track-record of funding made by the two leading handheld companies, Handspring and Palm, Inc. The results of my findings were even more surprising than I had expected. It was evident that for inner-city youth the grant making patterns of these companies rarely benefited them directly outside the school setting and often made no substantial gains in edging their digital divide.

THE DIGITAL DIVIDE

The economic and political conditions that gave rise to the digital age created a gap between people and communities who can make effective use of information technology and those who cannot. The term digital divide refers to this gap that excludes many from the benefits of the current digital society and economy. The extent of the divide and whether the divide is growing or narrowing remains contentious, but researchers are nearly unanimous in acknowledging that some sort of disparity exists.

According to Nielsen/Netratings' Global Internet Trends for 2001, Six percent (429 million) of the world's population is online globally and most are in North America (41%) where the United States has more computers than the rest of the world. As for the rest of the world:

- 27% of the online population lives in Europe, the Middle East and Africa (25% of European Homes are online)
- 20% of the online population logs on from Asia Pacific (33% of all Asian Homes are online)
- Only 4% of the world's online population are in South America

In fall of 2000, the U.S. Department of Commerce published Falling Through the Net: Toward Digital Inclusion which reported that:

- 51% of all U.S. homes had a computer; 41.5% of all U.S. homes had Internet access

- White (46.1%) and Asian American & Pacific Islander (56.8%) households continued to have Internet access at levels more than double those of Black (23.5%) and Hispanic (23.6%) households.
- 86.3% of households earning \$75,000 and above per year had Internet access compared to 12.7% of households earning less than \$15,000 per year.
- Nearly 65% of college graduates have home Internet access; only 11.7% of households headed by persons with less than a high school education have Internet access.
- Rural areas, though still lagging behind urban areas, had surpassed inner-cities in Internet availability and use:
 - Urban 42.3
 - Rural 38.9
 - Inner-cities 37.7
- Of those who use the Internet outside the home, 62.7% do so at work, 18.9% at K-12 schools, 8.3% in other school settings, 9.6% at libraries, .5% at Community Centers, and 13.8% use someone else's computer.

At the beginning of 2004, Nielsen/Netratings reported that three out of four people living in the United States (204.3 million) have access to the Internet. Those who have access to the internet in their homes at all times whether or not they log on was 66%, and rising nine percentage points every year.

As technologies emerge or improve, there are those who fall farther behind or find it difficult to keep up. I suggest that Broadband access to the Internet in the United States is an indicator of a continuing rift. According to Nielsen/Netratings, 39 million, or 13 percent of U.S. residents are connecting to the Internet via broadband.

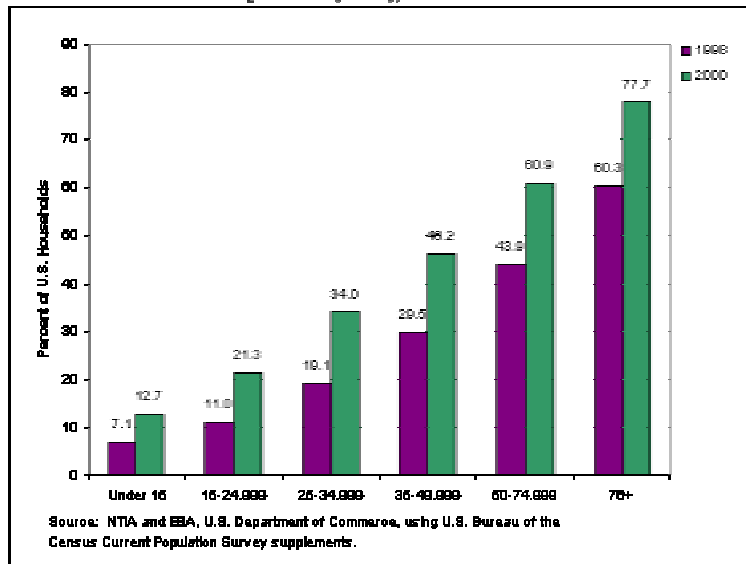
Internet Connection Speed Growth Rates (U.S., At-Home)

Speed	May 02 (000)	May 03 (000)	% Change
Broadband Total	26,113	38,957	49.2%
Narrowband Total	79,444	69,647	-12.3%
Modem 14.4K	3,966	3,454	-12.9%
Modem 28.8/33.6K	12,014	10,118	-15.8%
Modem 56K	63,465	56,075	-11.6%

Despite higher growth rates for broadband (49 percent year-over-year), there are nearly twice as many narrowband users as broadband users in the U.S. Narrowband users continue to outweigh broadband users. There is clearly some kind of gap among those who do have access. How greater must the gap be for those who don't even have access to a 56K modem?

As the following chart shows, access to any kind of Internet access is definitely related to income. The trend is true for access to all digital technologies.

Figure I-6 Percent of U.S. Households with Internet Access by Income (2000), 1998 and 2000



WIRELESS TECHNOLOGY SENDS THE DIGITAL DIVIDE ROAMING.

The foundation of wireless technology was put in place in the early 20th century with transmissions using radiotelegraphy (Morse Code). When modulation was introduced, it became possible to add voice and other sound data to electronic signals: Radio was born. And as more of the range of frequencies and the spectrum was used television was born to carry visual and audio data. Garage door openers, television remote controls, Cordless telephone sets, Two-way radios, fax machines and so many more wireless devices soon become a part of everyday life. Using a modulated electronic signal (AC), Infrared (IR) light or radio waves (RF) to enable two-way communication without a cord became the basic foundation for the rise of the current wireless world where data can be transmitted “through the air.”¹

In their first generation, cellular phones were nothing more than wireless technology used for voice communication, but have since become the foundation, if not the backbone, of an Internet based wireless world. Devices such as laptop computers and handheld computers were mobile rather than wireless because they needed a cable to connect to a network such as the Internet. Current wireless technology is characterized by the merging of mobile

¹ Wireless can be divided into:

- Fixed wireless -- the operation of wireless devices or systems in homes and offices, and in particular, equipment connected to the Internet via specialized modems
- Mobile wireless -- the use of wireless devices or systems aboard motorized, moving vehicles; examples include the automotive cell phone and PCS (personal communications services)
- Portable wireless -- the operation of autonomous, battery-powered wireless devices or systems outside the office, home, or vehicle; examples include handheld cell phones and PCS units
- IR wireless -- the use of devices that convey data via IR (infrared) radiation; employed in certain limited-range communications and control systems

personal productivity devices and wireless devices that can access networks and transmit data without cables and regardless of global location.

People today browse the internet and send e-mail on their morning commute to work, or while away from their office. Many access their business networks from home, the park, or while waiting to catch a flight. The paperless world is a reality as people beam PDFs to each other from their cell phones on their way to get coffee ordered by voice command from the same phone. Global positioning systems can find a person virtually anywhere on the planet, help cars navigate, and open doors of stranded motorists in California from headquarters in India. What was considered science fiction a decade ago is the reality that has changed the culture we live in. The following are a few of the now standards in wireless technology.

- Wireless local area networks (WLAN) -- provide flexibility extending a network outside the physical building that houses the servers.
- Global System for Mobile Communication (GSM) – currently the de facto wireless telephone standard in Europe and other parts of the world.
- General Packet Radio Service (GPRS) – provides continuous connection to the Internet for mobile phone and computer users
- Enhanced Data GSM Environment (EDGE) -- a faster version of the Global System for Mobile (GSM) wireless service
- Universal Mobile Telecommunications System (UMTS) -- a broadband system offering a consistent set of services to mobile computer and phone users no matter where they are located in the world
- Wireless Application Protocol (WAP) -- a set of communication protocols to standardize the way that wireless devices, such as cellular telephones and radio transceivers, can be used for Internet access (and what will make TV/Radio interactive any day now).
- i-Mode -- the world's first "smart phone" for Web browsing, first introduced in Japan; provides color video over telephone sets

Global business and the wealthy benefit the most. But for the urban poor access to these technologies just compounds the struggle to bridge the difficult digital divide.

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As the merger of cellular phone networks and the Internet matures to improve and spin off new technologies some people are just now buying Internet service for their desktop computers. And yet another leap in the digital age has left many behind.

GRANT MAKING EFFORTS THAT MIGHT HELP BRIDGE THE DIVIDE

Handspring and Palm were the pioneers of mobile wireless technology devices and software. With their merger earlier in 2003 their force can only grow stronger as a leader in the industry and give rise to newer applications of wireless capabilities. Prior to their merger the two companies had charitable programs. The Handspring Foundation was established in June 2000 to donate cash and equipment to support organizations and programs dedicated to creating positive change with special attention to pre K-12 education and issues directly related to children and youth at risk. The focus of the Palm Education Pioneers (PEP) Program Grants was to assess the learning opportunities and enhancements that handheld computers might provide in educational settings. Both of these programs have since suspended their funding programs.

THE HANDSPRING FOUNDATION

The Handspring Foundation was funded in June 2000 with 45,000 shares of pre-IPO Handspring stock. The fund was administered as an advised corporate foundation of the Peninsula Community Foundation and governed by an employee advisory group, responsible for evaluating requests and making formal grant recommendations in accordance with the foundation's mission, which was "to reflect the values, orientation and commitment of Handspring to be exemplary corporate citizens within the global community and to serve as a catalyst for change through charitable contributions and employee volunteerism."

According to Gisela Bushey, Worldwide Manager of the Handspring Foundation in 2000, the foundation formed because "employees expressed a strong interest in addressing issues surrounding children and youth at risk, so we dedicated this first round of grants to nonprofit organizations that serve children in necessary and effective ways." The Handspring Foundation selected five nonprofit organizations to receive their first grants in 2000, including:

- \$10,000 to the Emergency Housing Consortium of San Jose, California for general support of staffing and residential services of Our House, a 16-month transitional living program for runaway, homeless, and foster care youth who age out at 18 and no longer receive community services.
- \$7,500 to Via Rehabilitation Services of Santa Clara, California for operational support to expand the services provided by the First Step Early Intervention Program, a series of early intervention services for children with disabilities or developmental delays.

- \$7,500 to Laura's House of San Clemente, California to fund the Children's Learning Center and sustain efforts in providing direct services and child abuse and domestic violence prevention education to children experiencing the effects of domestic violence, as well as providing education and life skills useful once the children leave the shelter.
- \$5,000 to The Dance Institute of Washington, D.C. for operating support of their year-round dance education program targeting high-risk youth in Washington D.C.'s historically poor neighborhoods. The grant funded dance and production training, workshops, journal writing and performance opportunities.
- \$15,000 to the Greater Muchinjike Orphan Home Trust of Murewa, Zimbabwe for programs serving children orphaned by the AIDS epidemic, including HIV/AIDS education and awareness programs, expansion of the children's food program, self-sufficiency projects, and school fees for the orphaned children.

In addition to the quarterly cash grants, the Handspring Foundation also launched its Product Donation Program in 2000, whereby qualified nonprofit organizations were invited to apply for Handspring Visor Deluxe handheld computers. The organization was required to utilize the Visor Deluxes in an “innovative way that would create meaningful solutions to critical local and global community concerns.” Qualified organization were expected to focus on pre-K through 12 education and issues directly related to children and youth at risk, international humanitarian relief, arts and culture, health and human services, environmental protection, alleviating homelessness, or people with disabilities. The Handspring Foundation would donate up to 50 Visor Deluxes per selected request.

In 2001 the Handspring Foundation made 16 grants consisting of cash grants and product grants. Only one grant was in Southern California, a product grant that went to the Lennox School District. The overwhelming majority of the grants were made in Northern California or Colorado, generally in the vicinity where the company had its headquarters or some other important branch of their operation. Many of the grants were to assist professionals in some area of environmental conservation or medicine better deliver services using the handheld devices, peripherals and software available. Many grants went to professionals working in Latin American and Africa. Grants in urban regions such as New York, Atlanta, and DC were not product grants at all, rather were cash grants to support general operating funds for classic prevention, intervention, recreation programs for children and youth, including direct services, case management, direct program costs including purchase of backpacks (New Mexico), for examples. None of their grant making in urban regions had an emphasis on technology.

The only Southern California grant was awarded to Buford Elementary School in Lennox, California for social studies. Even though Lennox is more of a suburb of Los Angeles, the impact of the spreading metropolis and demographic shifts could make it qualify as an inner-city. In that case, at least one product grant went to an inner-city community. However, a review of the project descriptions for the Lennox grant shows no challenging

use of the devices beyond tools that promote rote memorization, or a slightly more “interactive gaming” way of learning about the presidents of the United State.

In the 2002 grant cycle, the Handspring Foundation made 14 grants. This time not one grant was in Southern California.

One promising grant went to Brava! For Women in the Arts in San Francisco where a product grant of 50 visors provided regular on site communication, scheduling, journaling and a multi faceted database to develop participants’ personal empowerment and self esteem, “a viable path and tow higher education and a rewarding career.”

Cash grants for inner-city communities in the 2002 funding cycle included more general operating support for foster care programs, transportation to and from after school programs for homeless children, and other classic service programs such as Hand on Food Growing project for at risk youth to grown and harvest vegetables. In Morgan Hill, California at the Community Solutions Program, for example, Handspring funds were used to support a restorative Justice Project which diverted youth from the juvenile justice system. None of these grants had a technology focus.

The trend of awarding grants to professionals continued as products were distributed to CALSTAR for trauma care nurses and physicians in Hayward, California, and to weather forecasters in Montana studying avalanches, for example. Product grants were awarded to professionals working on projects focusing on the developing economies of Ethiopia and Ecuador. Fifty visors were donated to the John W. Gardner Center for Youth and their Communities at Stanford University to do research in a project that did not actively involve the youth in leadership or technology learning.

PALM EDUCATION PIONEERS (PEP) PROGRAM GRANTS

Unlike the Handspring Foundation, the PEP Grants were all product grants with a specific focus on evaluating the potential of handheld computers for K-12 teaching and learning. When the program was inaugurated Mike Lorion, Vice President of Education at Palm said they were “committed to understanding how providing a powerful, personal, handheld computer for every student can provide the technology access required to create new classroom practices that can revolutionize the way teachers teach and the way students learn.” To meet this goal, in October2000, Palm partnered with SRI International, a nonprofit research and development organization which administered and evaluated the PEP Grants. SRI invited teachers in the fifty United States to apply for a PEP grant.

To qualify, educators had to develop an innovative plan to use Palm computers in the classroom. Since funding ceased, SRI conducted an evaluation of the impact these grants had in the classroom. Their findings have helped inform other teachers, researchers, hardware and software designers, and policymakers about best practices for using Palm computers in education. There were two rounds of awards for the PEP grants to over 100 grantees across the U.S.

The PEP program granted two types of awards: A total of 102 Classroom Teacher awards for classroom teachers or technology coordinators in K-12 schools. Nine PEP Research Hub Awards where awardees were research institutions, school districts, and graduate programs in education who would train and support a group of teachers to integrate technology in the classroom with a set of 15 Palm computers.

Of the 102 Classroom Teacher awards made through PEP, California received the most grants. Because of the focus of the PEP grants, all were given to private and public schools.

Awardees by States

Alabama [1]	Alaska	Arizona [1]	Arkansas	California [12]
Colorado [2]	Connecticut [2]	Delaware	Florida [6]	Georgia [1]
Hawaii	Idaho	Illinois [6]	Indiana [2]	Iowa [1]
Kansas [2]	Kentucky [1]	Louisiana [1]	Maine [3]	Maryland [1]
Massachusetts [2]	Michigan [5]	Minnesota	Mississippi	Missouri [1]
Montana	Nebraska [2]	Nevada	New Hampshire	New Jersey [1]
New Mexico	New York [7]	North Carolina [2]	North Dakota	Ohio [5]
Oklahoma	Oregon [3]	Pennsylvania [4]	Rhode Island [1]	South Carolina [2]
South Dakota [1]	Tennessee [4]	Texas [5]	Utah [1]	Vermont
Virginia [2]	Washington [7]	West Virginia [2]	Wisconsin [2]	Wyoming [1]

It was through the PEP grants that more innovative uses of wireless technology were explored. Some of the more interesting were:

- The Parent-Student-Teacher Palm-communication project at Thomas Jefferson Elementary in Anaheim, California where parents used palm handheld computers for parent-teacher-school communication. The classroom teacher would send home daily behavior notices, for parent review via handheld computers. Since many of the parents did not have phones in their homes (Thomas Jefferson is located in an economically challenged neighborhood), communication via the handheld computers was a viable tool for parent involvement.

- At Indio Middle School in Indio, California, the grant was used for publishing using the Palm Computer. Students in a seventh grade language arts and literature classes used Palm handheld computers as part of a "Problem Based Learning Project" in journalism. Students organized, named, and produced a school newspaper, which was published quarterly, starting in the fall of 2001.
- One grant was made to LAUSD's Downtown Business Magnet High School for a project called Environmental Science with Palms: Bringing Together Assessment, Investigation, and Inquiry "to empower students to use the technology to design and conduct an original investigation into an environmental question of their own choosing."

Public schools received 91% of the grants. Urban, rural, and suburban schools were represented 39%, 33%, and 30% respectively. Palm also went further with their grant making by evaluating. Their 2002 report documented their findings for K-12 use of technology.

Most projects though fell short of using the mobile Internet capabilities of the handheld devices, and instead the devices were used as an aid to improve teaching within the regular curriculum.

Even though Palm grants were made in inner-city communities, they were limited to the school setting. The impact of technology use and learning outside schools was not evaluated. There is a gap in research about the impact of wireless technology in community centers where the school's learning environment is extended and often enriched. It is unfortunate that community centers were excluded from the grant making especially since those with little or no access seek out these facilities to use technology.

BUILDING LEADERSHIP & TECHNICAL KNOWLEDGE

As prospective participants in the marketplace, more and more youth are being prepared with just enough skill to run cash registers, use RF communication devices (two way radios) in movie theaters, and run copy machines, for example. Few inner-city youth are being prepared to move into high power arenas and career opportunities founded on wireless technology. College, for those few auspicious inner-city youth, is the best opportunity for access. But what are the prospects for college in the current political/economic climate?

That isn't to say that inner-city youth are not being taught technology. But often they are not given access beyond a one time exposure to computers in a required computer course that may consist of reading about the role of computers but might never give them hands on access on a regular basis. As users they are computer literate, and based on my experience working with youth, they easily acquire new technology skills. Without mentorship, though, youth will be quick to use technologies for gaming which is not surprising since inner-city youth are targeted as consumers and are acculturated to internet skills that lead to mere music downloading, gaming, shopping, and entertainment. How

ironic that cell phones, a pillar of the wireless world, are readily available to inner-city youth, yet the technical comprehension, imaginative, and entrepreneurial bearing of the technology in their hands is not being instilled. They don't naturally realize the power behind the little processors in the palm of their hands. Youth need to be guided, given background into the technology behind these devices, the impact, the use, the hardware software, etc.

There are no commercial interests in empowering youth with skill sets that might better position them in global communication, business, engineering, etc. This kind of disinvestment damages the very framework of their lives. It's critical that inner-city youth take control of the Internet and wireless technologies to have more self-determination. Social inequities are maintained by the current rift between the technology haves and have nots, and is creating a low skilled working class that knows how to push the right buttons in sequence without knowledge of why. Why have critical thinking and analytical skills disappeared for inner-city youth?

To be competitive, bring about an end to poverty, and provide hope and opportunity, youth need skills and a knowledge base in a wireless world. In schools we teach youth the fundamental skill of map reading to help them navigate the world around them. That fundamental skill transferred to the practical, were youth need to navigate the architecture of the current digital world falls short for so many inner-city youth who struggle to learn all the while besieged by overcrowded classrooms, substandard facilities & instructors, bureaucratic school districts, every tightening budgets, and not least of which is the loss of critical and analytical thinking which has been replaced by rote memorization to meet standardized tests.

There are some positive prospects from within the industry. It is estimated that in the near future, more cell phones will be connected to the Internet than computers. The responsibility of narrowing the digital divide, then, to some extent then falls on telecommunications companies. And they have the capacity to help since they are benefiting from the boom in the global market. Thanks to telecommunications e-commerce is the fastest growing retail, service, and content channel in the U.S. economy. According to Forrester Research, after five years of blazing 97% annual growth, U.S. e-commerce will still grow at a powerful 25% compound annual rate through 2007 when it will represent 8% of retail sales, and an even larger percentage of service and content sales (travel, consulting, news, culture, music, videos, TV/Radio/Movies, etc).

In October 2000, Cable & Wireless, a dynamic 130 year old global telecommunications enterprise brought together leading companies and high profile leaders in technology from around the globe to discuss how to overcome the divide between the world's technology haves and have not's which is resulting in exclusion from the economic and educational opportunities for poor people in western countries as well as communities in the developing world. The power of the Internet and wireless communications was central in the conversation.

Some recommendations for change included providing free Internet access, computer hardware and training to schools, and scholarships to study technology with special emphasis on ethnic minorities

Unfortunately Cable & Wireless only convened and promoted awareness within the industry which did little more than create informed advocates and kept the buzz about the digital divide chic. Yet inner-city youth need technology educators, innovator and entrepreneurs to develop leadership in technology.

CONCLUSION

The impact of wireless technology for global business and culture is unimaginable sometimes. Yet for those on the margins it means the prospect of continued poverty, lower wages, less participation in democracy (i.e. online voting), less visibility in the public discourse, and just another bleak layer over their underclass status. Without intervention the rich will continue to get rich and the poor will fall farther behind. Without daily access to the hardware and software that run the wireless world we live in inner-city youth fall farther behind. Trainings that do not include the mechanics and architecture of the digital age prepare youth for low wage positions not much better than service jobs. These jobs are marketed as technology based but really only involve the basic skills of how to press the right combination of buttons. Without critical thinking and problem solving inner-city youth will never dream about building the digital architecture of their generation or dream of using the knowledge base and skills to run their own businesses. A job packing wireless devices seems an unfair expectation for youth growing up in the world's leading producer and consumer of technology.