JOINT VENTURE'S

2002 workforce study

CONNECTING TODAY'S
YOUTH WITH TOMORROW'S
TECHNOLOGY CAREERS

Conducted by A.T. Kearney

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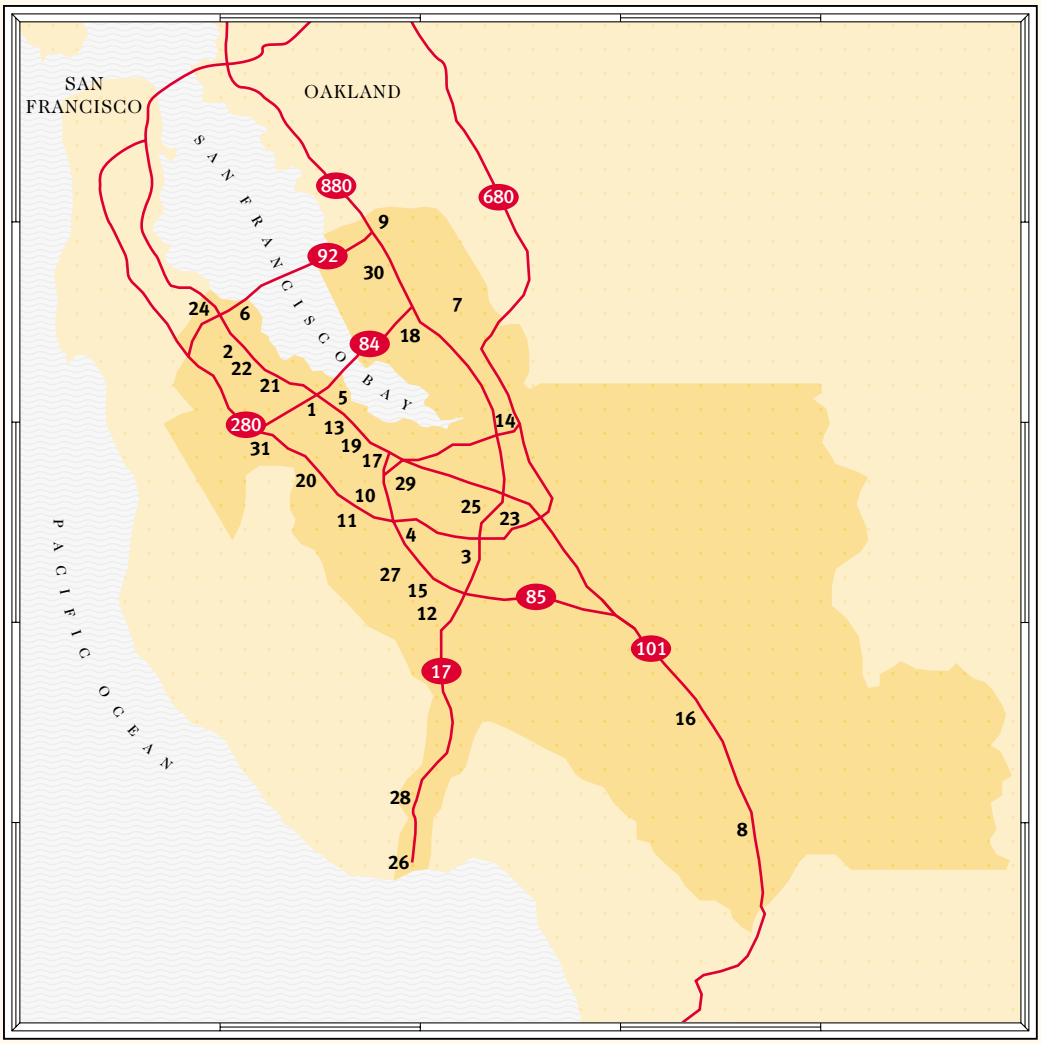


SILICON VALLEY'S 31 COMMUNITIES

1 Atherton
2 Belmont
3 Campbell
4 Cupertino
5 East Palo Alto
6 Foster City
7 Fremont
8 Gilroy
9 Hayward
10 Los Altos
11 Los Altos Hills
12 Los Gatos
13 Menlo Park
14 Milpitas
15 Monte Sereno
16 Morgan Hill
17 Mountain View
18 Newark
19 Palo Alto
20 Portola Valley
21 Redwood City
22 San Carlos
23 San Jose
24 San Mateo
25 Santa Clara
26 Santa Cruz
27 Saratoga
28 Scotts Valley
29 Sunnyvale
30 Union City
31 Woodside

Introduction

The *2002 Workforce Study* is the latest collaborative effort between A.T. Kearney and Joint Venture: Silicon Valley Network to detail the workforce trends that shape Silicon Valley's business, educational and social environments. This study focuses on a population that is critical to the region's economic future: youth in Silicon Valley today. Drawing on a survey of more than 2,500 8th- and 11th-graders across the region, we examine young people's technology use, career interests and career influences in order to assess the prospect that today's Silicon Valley youth will account for a major share of tomorrow's high-tech workforce. This study finds that while computer and Internet usage among Silicon Valley students is very high, there is a need to increase their understanding of and affinity for technology-related careers—particularly among Hispanic students, female students and students from lower socioeconomic backgrounds.

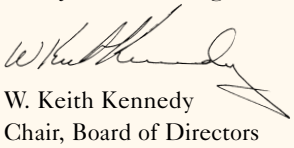
The recent economic downturn has made the past year an extremely challenging one for Silicon Valley businesses, workers and communities. Hundreds of new Internet firms have closed, and many larger, more established technology companies have posted lower earnings and made significant workforce reductions. However, this downturn should not obscure the fact that long-term economic forecasts for Silicon Valley are strong, or that technology-related positions are expected to drive much of the region's job growth over the next decade. By enabling more students to learn about—and prepare for—technology fields, we increase the opportunities for these students to share in the region's future growth and prosperity.

Additionally, ensuring that a broader population of students is prepared for tomorrow's technology-related careers can help prevent any future shortages of high-tech workers in Silicon Valley. The workforce gap analysis presented here—an update of the analysis that appeared in our *1999 Workforce Study*—illustrates not only that the high-tech workforce gap expanded significantly during the technology boom of the late 1990s, but also that the workforce gap today still costs local high-tech businesses $2–3 billion annually, even in the wake of the recent economic slowdown. If Silicon Valley is to remain a major economic force in the years ahead, the region must find ways to more fully develop its local pool of high-tech talent—including today's students.

Three years ago, A.T. Kearney and Joint Venture: Silicon Valley Network joined forces to produce the *1999 Workforce Study*. This groundbreaking report has been referenced in various publications around the world and has been downloaded more than any other study ever published by Joint Venture. More importantly, the *1999 Workforce Study* generated a great deal of interest and discussion among policy-makers, educators, parents and business leaders. Using the 1999 study as a basis, these groups began working together to develop strategies for ensuring that *all* residents of Silicon Valley have the opportunity to succeed in the region's economy.

The *2002 Workforce Study* should provide an impetus for the continuation and expansion of those important efforts. This report concludes with a **Call for Discussion** (page 25) that presents some of the most vital questions that follow from this study's findings. Our hope is that by highlighting these key issues, we will inspire new partnerships among businesses, community organizations, schools and government to ensure that economic growth in Silicon Valley is both sustainable and inclusive.

To learn more about Joint Venture and to access a full list of activities and publications, please visit www.jointventure.org.



W. Keith Kennedy
Chair, Board of Directors
Joint Venture: Silicon Valley Network

John Ciacchella
Vice President and Managing Director
Americas High Technology Practice
A.T. Kearney

Executive Summary

To prepare youth for the types of technology-related jobs driving Silicon Valley's long-term economic growth, the region must work both to increase young people's understanding of and interest in technology professions and to connect them with career opportunities, information and guidance.

Silicon Valley experienced tremendous economic growth during the late 1990s, creating an intense demand for—and severe shortage of—skilled technology workers in the region's innovation-driven economy. By October 2000, the Silicon Valley high-tech workforce gap (the total number of unfilled positions, workers actively recruited from outside of the Bay Area and workers who must commute from areas outside of the Valley) had grown to 39 percent of the high-tech labor demand. More recently, the economic slowdown of late 2000 and 2001 has caused the workforce gap to shrink dramatically; by July 2001, the workforce gap was 25 percent of the high-tech labor demand—a 14 percentage point drop in just nine months. However, the gap still accounted for $2–3 billion in annual incremental costs (lost productivity/opportunity costs, salary premiums, turnover and hiring costs) for Silicon Valley high-tech businesses.

Despite the recent economic slowdown, projections for long-term job growth in Silicon Valley remain quite strong. The future economic vitality of Silicon Valley, therefore, will depend in part on the region's ability to increase the local pool of well prepared, tech-savvy professionals. One key facet of this effort should involve working to fully develop the region's "homegrown" high-tech talent. Doing so would not only help prevent future shortages of technology workers, but would also contribute to the sustainability of Silicon Valley communities by helping individuals who grow up here succeed in the local job market.

Drawing primarily on a survey of more than 2,500 8th- and 11th-graders in public and private Silicon Valley schools, A.T. Kearney examined technology acclimation among area students in order to gauge the linkage between today's students and future technology careers. The following are some of the key findings:

1. Computer access and usage are very high among Silicon Valley students. Ninety-nine percent of students have access at some location (home, school, friend's home, library, etc.), although Hispanic students and students from lower-income families are less likely to have home access to computers. Ninety-one percent of students reported using computers for both educational *and* entertainment purposes.
2. Although 73 percent of students reported having some familiarity with at least two high-tech occupations, student awareness of high-tech careers lags behind their awareness of more traditional professions.
3. There is a considerable drop-off between student awareness of high-tech careers and student interest in these careers, with 32 percent of students planning to pursue technology- or computer-related careers. Students offered various reasons for not wishing to pursue high-tech careers, such as that they found such careers uninteresting or intimidating, they disliked computers, or they had other interests.
4. More than three-quarters (82 percent) of the students plan to pursue some type of postsecondary education (four-year college, two-year college or vocational program). However, the proportion of Hispanic students planning to attend *four-year college specifically* (53 percent) is significantly lower than that of Asian (74 percent), African American (69 percent) and White students (69 percent). This suggests that Hispanic students are less likely than their peers to obtain the type of postsecondary training required for the region's higher-paying jobs.

5. There is a gender gap with regard to student awareness of and interest in technology careers, with females being only about half as likely as males (23 percent vs. 42 percent) to report wanting to pursue a high-tech career.

The survey of Silicon Valley students also showed the considerable influence that students' social networks have on their career interests and on their access to career information and guidance. For instance, students whose parents both are in high-tech professions are more likely to be interested in technology careers. In addition, more than three-quarters (83 percent) of students obtain job and career information through family and friends, although students from lower socioeconomic backgrounds are far less likely to rely on personal relationships for this information. Sixty-six percent of students obtain career information from the mass media, a source that—according to outside research—generally presents unflattering and unrealistic images of technology workers.

These findings point to a broad range of challenges that Silicon Valley must address, such as providing students with accurate information about technology careers, ensuring that students from *all* backgrounds have the skills needed to succeed in an increasingly knowledge-based economy and expanding the types of social networks that foster career advancement. Based on these findings, Joint Venture puts forth a **Call for Discussion** to all Silicon Valley stakeholders, including students, parents, educators, business leaders, community organizations and public officials. This year, Joint Venture will bring these stakeholders together to work toward the full development of the region's "homegrown" talent and widespread opportunity for all of our youth.

"THE LONG-TERM HEALTH OF OUR REGION'S ECONOMY DEPENDS ON HOW FULLY WE COMMIT OURSELVES TO PREPARING ALL STUDENTS—ESPECIALLY THOSE WHO ARE NOW LEAST ENGAGED—FOR THE JOBS OF THE FUTURE."

JOHN VASCONCELLOS, CALIFORNIA STATE SENATOR, 13TH DISTRICT

Goals and Structure of This Study

Silicon Valley's economy is projected to experience solid growth over the next decade, with the demand for qualified high-tech workers expected to rise substantially over the next several years. According to some business and community leaders, ensuring a growing pool of skilled, educated high-tech professionals is one of the most critical challenges to Silicon Valley's future economic vitality.

While there most likely will always be some influx of high-tech workers into the region, there are many potential advantages to making cultivation of a "homegrown" workforce a central strategy for meeting the anticipated demand for high-tech workers. Over the long term, improved development of the region's homegrown high-tech talent could hold down businesses' recruitment and employment costs by decreasing the need for employers to lure workers from outside of the region. In addition, increased utilization of the locally based labor force could potentially reduce the environmental and infrastructural impacts that result from workers having to commute into the Valley daily from distant communities. Furthermore—and perhaps most importantly—developing a homegrown high-tech workforce will contribute to the general sustainability of Silicon Valley communities by increasing the chance that individuals who grow up in the region will have the opportunity to remain here and thrive in the local economy.

This report begins by updating the workforce gap analysis that was presented in Joint Venture and A.T. Kearney's *1999 Workforce Study*. By drawing on new data from October 2000 and July 2001, this update illustrates both how the workforce gap expanded during the technology boom of the late 1990s and how it has shrunk rapidly due to the recent downturn. As in the *1999 Workforce Study*, the workforce gap analysis presented here quantifies the gap's financial implications for Silicon Valley businesses. The workforce gap update draws on data from public agencies, interviews with Silicon Valley employers and secondary research.

Next, the report takes a long-range view at the future of Silicon Valley's homegrown workforce—students currently in public and private junior high and high schools across the region. Using an innovative "technology acclimation framework" designed by A.T. Kearney, the report examines how today's student population uses technology and the extent to which today's students intend to pursue high-tech careers. The report also examines the relationship between students' social networks and their career interests. This analysis explores how parents, friends, school and other influences contribute to students' educational and career plans, with an eye toward understanding better how these influences bear upon students of different backgrounds.

Throughout the study, special attention is paid to how technology use, career interests, social networks and other factors vary among students from different racial, ethnic and socioeconomic backgrounds. In creating a regional economy that more equitably benefits all Silicon Valley residents, it is essential to understand how certain groups of students are—or are not—on track to participate and flourish in that economy.

The final section of the report is a Call for Discussion that summarizes the study's key points and suggests how the region can move forward in exploring and addressing the implications of these findings.

"INVESTING IN PROGRAMS THAT PROMOTE ECONOMIC OPPORTUNITY FOR A BROADER POPULATION OF SILICON VALLEY RESIDENTS IS NOT ONLY AN INVESTMENT IN OUR COMMUNITY—IT'S AN INVESTMENT IN OUR COMPANY'S FUTURE."

JAMES DEICHEN, MANAGING DIRECTOR, BANC OF AMERICA SECURITIES LLC

Workforce Gap Update

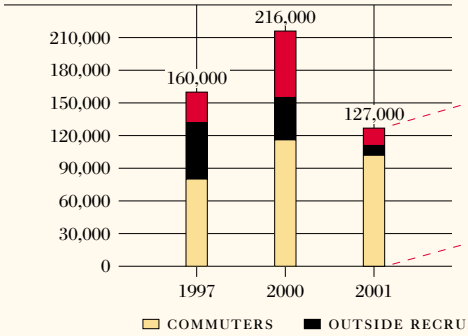
The Silicon Valley workforce gap—which includes unfilled positions, people actively recruited from outside of the Bay Area and workers who must commute from areas outside of the Valley—is a useful tool for measuring the extent to which Silicon Valley high-tech industry clusters can rely on local labor to meet their workforce needs. Drawing on new data from October 2000 and July 2001, our analysis of the Silicon Valley workforce gap illustrates both how the workforce gap expanded during Silicon Valley's economic boom of the late 1990s and how this gap has contracted rapidly as a result of the recent economic slowdown.

1997 TO 2000: AMID THE ECONOMIC BOOM, THE WORKFORCE GAP EXPANDS

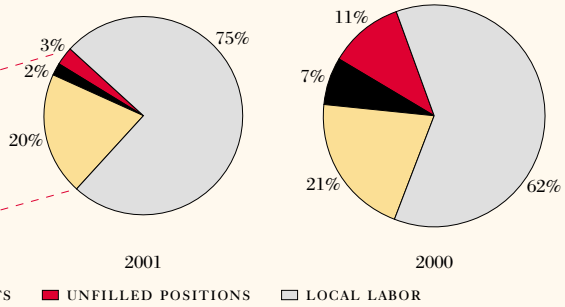
The period between 1997 (the first year for which A.T. Kearney conducted a workforce gap analysis) and 2000 was a time of substantial economic growth and low unemployment in Silicon Valley. During this period, the workforce gap expanded from 33 percent of the total high-tech labor demand to 39 percent. Our analysis also shows that between 1997 and 2000, the *composition* of the workforce gap shifted. Unfilled positions in the high-tech industry clusters increased substantially (from 5–7 percent to 11 percent of the total high-tech labor demand), while the percentage of commuters increased slightly (from 16–18 percent to 21 percent). These numbers suggest that between 1997 and 2000, employers found it more difficult to fill positions and, relatedly, relied somewhat more on workers who live in Bay Area communities beyond Silicon Valley. The only workforce gap segment that *decreased* from 1997 to 2000 was outside recruits, which dropped from 10–12 percent to 7 percent of the high-tech labor demand. Some industry observers attributed this decrease to the cooling down of the dot-com craze in late 1999 and 2000, noting that technology professionals who had not already relocated to Silicon Valley were detracted from doing so by the high cost of living and concerns about congestion.

AFTER EXPANDING BETWEEN 1997 AND 2000, THE WORKFORCE GAP DROPPED STEEPLY BETWEEN OCTOBER 2000 AND JULY 2001, WITH UNFILLED POSITIONS AND OUTSIDE RECRUITS ACCOUNTING FOR MUCH SMALLER SHARES OF THE OVERALL GAP.

ESTIMATED WORKFORCE GAP IN HIGH-TECH INDUSTRY CLUSTERS[1]



TOTAL LABOR DEMAND IN HIGH-TECH INDUSTRY CLUSTERS, 2000 AND 2001



Note: Total labor demand for high-tech industry clusters was 468,000 in 1997, 570,000 in October 2000, and 510,000 in July 2001.
[1] Industry clusters include semiconductor, computer/communications, software, bioscience, aerospace and defense, innovation/manufacturing services, and professional services.

Source: A.T. Kearney, Workforce Study

2000 TO 2001: THE WORKFORCE GAP SHRINKS RAPIDLY DUE TO THE ECONOMIC DOWNTURN

The nationwide economic downturn that began in the latter half of 2000 hit Silicon Valley and the Bay Area with considerable force. Internet firms closed at a growing pace in late 2000, while larger, more established technology firms, which had driven much of the local job growth in the late 1990s, announced major workforce reductions. Consequently, the Silicon Valley high-tech workforce gap shrunk dramatically between October 2000 and July 2001, decreasing from 39 percent to 25 percent of the high-tech labor demand. Expressed in terms of the number of positions (as opposed to the percentage of labor demand), the workforce gap decreased from 216,000 to 127,000—a 41 percent drop—in just those nine months.

Looking at the individual segments of the workforce gap, we find that the shrinking gap resulted from both a decreased need to recruit workers from outside of the Bay Area and a smaller proportion of unfilled positions. Outside recruits dropped to 2 percent of the total high-tech labor demand, and unfilled positions dropped to 3 percent. In fact, unfilled positions have been the most volatile segment of the workforce gap, jumping from 5–7 percent of the high-tech labor demand in 1997 to 11 percent in 2000, then dropping all the way to 3 percent in July 2001.

Our analysis suggests that the high-tech workforce gap has tended to increase—and decrease—along with the rate of Silicon Valley's economic growth. Thus, despite shrinking recently, the workforce gap will most likely widen again as the region's economy bounces back, with unfilled positions driving much of the workforce gap's expansion. Unless the region takes steps to increase the local pool of high-tech talent in the coming years, the workforce gap will be a serious and persistent burden on Silicon Valley's technology sector.

THE FINANCIAL IMPACT ON SILICON VALLEY BUSINESSES

The growth of Silicon Valley's workforce gap between 1997 and 2000 resulted in a sizable increase in the incremental costs to area businesses. In just those three years, the annual total of incremental costs skyrocketed from $3–4 billion to $6–7 billion.[1] Components of these incremental costs include the following:

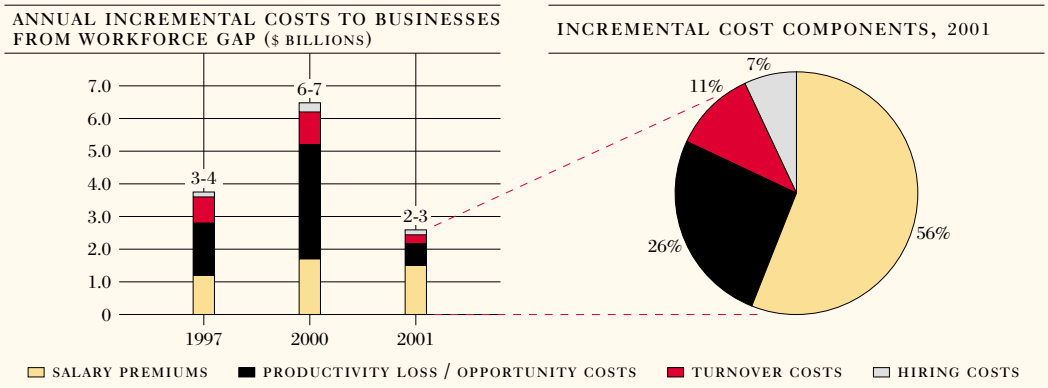
- Lost productivity/opportunity costs, such as delayed product launches, low productivity, and lost sales, innovation and intellectual capital
- Salary premiums needed to attract and retain qualified employees
- Turnover costs
- External hiring costs, such as search firms, contractors, temporary workers and external communications
- Internal hiring costs, such as human resources staff, referral fees, and on-boarding and ramp-up costs (orientation, set-up, training, certification/licensing and relocation)

Each of these cost components increased in absolute terms between 1997 and 2000, though there was some shift in their relative shares of the costs. The largest share gain was in lost productivity/opportunity costs, which grew from 36 percent to 52 percent of total incremental costs, possibly owing to the increased percentage of unfilled positions in high-tech industry clusters.

[1] To estimate the incremental costs to businesses resulting from the workforce gap, A.T. Kearney developed a quantitative model based on research into the historical variation of these costs and extensive interviews with human resources professionals.

As the workforce gap shrank between 2000 and 2001, the annual incremental costs to businesses dropped steeply—but still totaled $2–3 billion. Looking at the different cost components, we find that while turnover costs and hiring costs also decreased in absolute terms, the sharpest drop was in lost productivity/opportunity costs, which declined from $3.5 billion to just $0.7 billion and—as a share of the total costs—from 52 percent to 26 percent. Salary premiums declined only slightly and, in fact, have been the most stable component of the total annual incremental costs, remaining very close to $1.5 billion in 1997, 2000 and 2001.

AFTER INCREASING TO $6–7 BILLION IN 2000, BUSINESSES' ANNUAL INCREMENTAL COSTS RESULTING FROM THE WORKFORCE GAP DROPPED TO $2–3 BILLION IN 2001.



Source: A.T. Kearney, Workforce Study

Report Methodology

Long-term economic and employment projections for the region underscore the importance of developing a comprehensive, multifaceted strategy for increasing the local supply of high-tech workers. As already noted, one facet of this strategy could involve increasing the "pipeline" of local high-tech talent by helping today's Silicon Valley students gain the knowledge and skills needed to thrive in the regional economy. Fully cultivating the region's high-tech talent is a daunting, complicated task, and meeting this challenge requires a solid understanding of where current students stand in relation to high-tech careers, what factors affect student interest in technology jobs and how different groups are preparing for participation in the workforce.

FRAMEWORK

After being engaged by Joint Venture to study connections between different Silicon Valley populations and high-tech careers, A.T. Kearney developed a framework for assessing exposure to and utilization of technology. This framework tracks the stages of individual technology acclimation, beginning with access to technology, moving through stages of increased involvement with technology and culminating with employment in the technology sector. By breaking the complex process of technology acclimation down into discrete steps, this model makes it possible to gather and analyze data that illustrate how different groups of people are progressing along this continuum.

The technology acclimation framework includes the following stages:

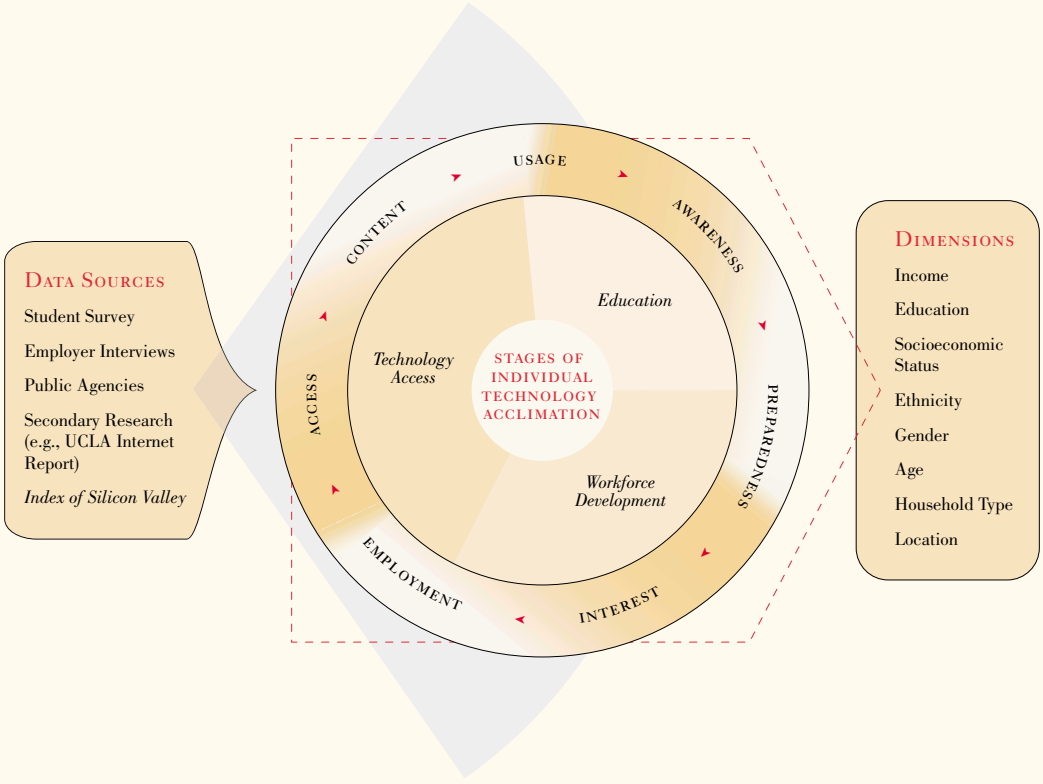
- **Access:** the ability to access computers and the Internet from home, school, work, community centers, libraries or other locations
- **Content:** the supply of relevant information and resources available online or in the physical world that enables individuals to gain knowledge of and experience with technology
- **Usage:** the activities for which technology is used (work, research, e-mail, shopping online, chat rooms or entertainment) and the duration of technology usage
- **Awareness:** understanding of high-tech career opportunities and of the potential benefits of these careers
- **Preparedness:** technology proficiency and skills, and the readiness to use technology in a work setting (Note: For K–12 students, preparedness refers to the individual's *intent* to prepare rather than *actual* preparedness.)
- **Interest:** the propensity of an individual to pursue employment opportunities in a technology field
- **Employment:** working as an employee or entrepreneur in high-tech industries or in technology positions in traditional industries

For the purposes of this framework, technology careers are defined both vertically within the high-tech industry and horizontally across other industries. In other words, an employee of a high-tech company is defined as a high-tech worker, even if he or she works in a non-technical area (administration, sales, marketing, etc.). In addition, anyone working in a technology position in a traditional industry would be considered a high-tech worker. It should be noted, however, that the numbers reported in the Workforce Gap Update (pages 6–8) adhere to the definition of high-tech worker used in the *1999 Workforce Study*, which included only individuals employed by high-tech companies. Were the workforce gap analysis to utilize the technology acclimation framework's broader definition of high-tech worker, the workforce gap numbers could be significantly higher.

DATA SOURCES

Our technology acclimation analysis draws on primary research as well as a variety of secondary sources. The foundation of this analysis is a survey of more than 2,500 8th- and 11th-grade students in Silicon Valley, conducted in late 2000. These students were drawn from a diverse group of 21 public and private schools reaching from San Mateo and Union City in the north to San Jose in the south.[2] Other data sources include key reports from public agencies, universities, foundations, professional associations and other entities. Taken together, these sources offer insights into how a variety of demographic variables—ethnicity, gender, socioeconomic status and others—are associated with the different stages of technology acclimation.

TECHNOLOGY ACCLIMATION FRAMEWORK

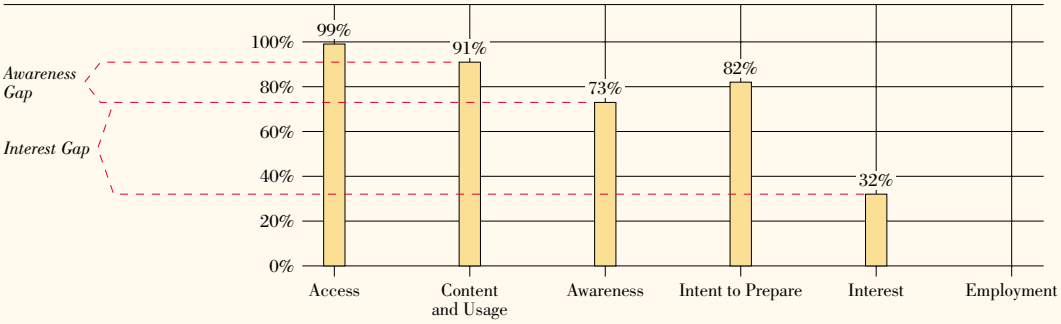


[2] The 2,616 survey respondents included 2,331 students (89 percent) from public schools and 285 students (11 percent) from private schools.

Are Today's Silicon Valley Students Tomorrow's Technology Professionals?

An analysis of student survey data offers a rather mixed portrayal of the linkage between current junior high and high school students and future careers in technology. The survey data are encouraging in terms of computer access and usage among Silicon Valley students. Students as a whole enjoy a very high level of access to computers. Moreover, 9 of 10 Silicon Valley students are using computers and the Internet for both educational and recreational purposes. However, our analysis also reveals that despite widespread computer access and usage, student awareness of high-tech careers continues to lag behind their awareness of more traditional professions. Furthermore, while we estimate that about one-third of Silicon Valley students are interested in pursuing technology-related careers, this represents a considerable drop-off from students' awareness of such careers. In other words, in tracking Silicon Valley students' process of technology acclimation, our analysis points to an "awareness gap" as well as an "interest gap," both of which could diminish the region's ability to fully develop its homegrown workforce.

TECHNOLOGY ACCLIMATION AMONG STUDENTS



Source: A.T. Kearney, Student Survey

At the most general level, this analysis might seem to affirm what is rather intuitive: that having a computer does not necessarily inspire one to become a computer programmer or a Webmaster, in much the same way that having a calculator does not necessarily inspire one to become a mathematician. However, the survey data make possible an increased understanding of student technology acclimation and shed light on how progress across the acclimation stages can vary based on ethnicity, socioeconomic background and gender. These types of insights can assist Silicon Valley not only in helping more students prepare for the careers of tomorrow, but also in ensuring that the future high-tech workforce reflects the region's rich diversity.

"IT HAS BEEN MY EXPERIENCE THAT THE DESIRE TO GET CONNECTED SHOULD NOT BE TAKEN FOR GRANTED. EVEN IF ACCESS EXISTS AND IS AFFORDABLE, EVEN IF SKILLS EXIST OR CAN BE TAUGHT READILY, EVEN IF RELEVANT CONTENT IS AVAILABLE, AN INDIVIDUAL CAN STILL REFUSE TO GET CONNECTED IF THE DESIRE HAS NOT BEEN STIMULATED OR IF OTHER PSYCHOLOGICAL OR PHILOSOPHICAL INHIBITIONS ARE IN THE WAY."

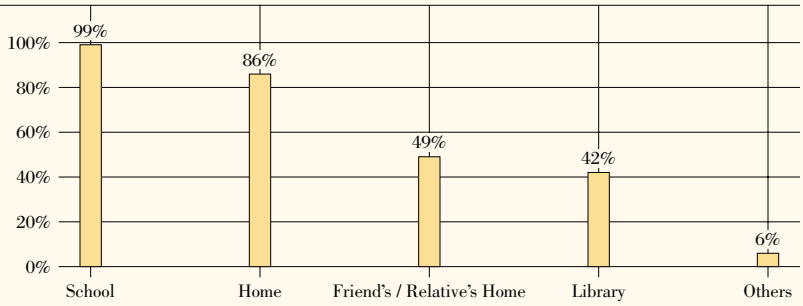
ERIC BENHAMOU, CHAIRMAN, 3COM CORPORATION

TECHNOLOGY ACCESS

Access to computers is very high among Silicon Valley students. Survey data show that 99 percent of the region's students have computer access at home, a friend's or relative's home, school, work, or public locations such as libraries and community centers. The survey data also indicate that student access *at home* tends to vary across income and ethnic groups. Students from lower-income families are less likely to have home access to computers.[3] In addition, home access to computers is less common among Hispanic students (69 percent with home access) and African American students (80 percent) than among their White and Asian counterparts (both 94 percent).[4] The survey data indicate that there is little variation across income or ethnic categories in terms of the number of students reporting computer access in the other settings (such as school, friend's or relative's home, or library), although outside research indicates that there likely are differences in the quality of computer access available to students of different backgrounds.[5]

TECHNOLOGY ACCESS IS VERY HIGH AMONG SILICON VALLEY STUDENTS, WHO USE COMPUTERS IN A VARIETY OF SETTINGS.

POINTS OF COMPUTER ACCESS FOR STUDENTS



Note: "Access" pertains to where students reported actually using computers and/or the Internet. Therefore, the survey results may understate individual points of access that may, in fact, be *available* to students (for instance, a local library) but of which individual respondents were not aware.

Source: A.T. Kearney, Student Survey

[3] On the student survey, it was deemed inappropriate to ask students about their family incomes. Therefore, income level is determined by the median household income for the student's ZIP code of residence. This data was obtained from CACI (www.demographics.caci.com), which extrapolated this data from 1990 U.S. Census figures.

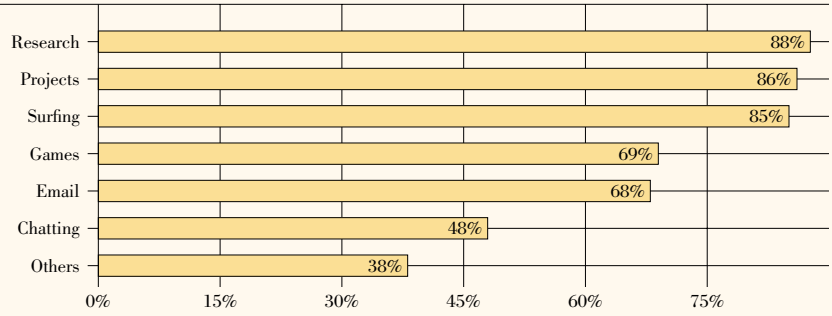
[4] For the purposes of this study, the category of Asian students encompasses Asian and Filipino students. Of the 2,616 survey respondents, 404 identified themselves as Asian and 323 as Filipino.

[5] For instance, the California Department of Education, Education Demographics Unit found that in 1999–2000, low-minority schools in San Mateo and Santa Clara Counties had 20.7 computers per hundred students, compared to 15.3 computers per hundred students at high-minority schools.

TECHNOLOGY CONTENT AND USAGE

Not surprisingly in light of the high level of computer access, Silicon Valley students reported very high levels of computer and Internet usage. Ninety-one percent of students reported that they use technology for both learning-related activities (research or projects) *and* recreational purposes (surfing the Internet, games, email or chatting). In addition, the most common categories of computer and Internet usage among students are research (88 percent), projects (86 percent) and surfing (85 percent), all of which are much higher than usage levels for games, email and chatting. This suggests that Silicon Valley students use technology as much for educational and research purposes as for entertainment. On this point, our analysis of students' usage patterns is generally in line with a recent UCLA study of U.S. Internet usage, which found that several of the most common uses of the Internet involve information-gathering.[6]

STUDENTS' ONLINE ACTIVITIES



Source: A.T. Kearney, Student Survey

STUDENTS UTILIZE COMPUTERS AND THE INTERNET FOR A BROAD RANGE OF EDUCATIONAL AND RECREATIONAL PURPOSES, WITH RESEARCH AND PROJECTS BEING THE MOST COMMON USES.

"THE FUTURE OF SILICON VALLEY RESTS IN ITS PEOPLE AND IN ITS COMMUNITIES. WE NEED TO TAP THEIR ENERGY AND PROVIDE THEM WITH OPPORTUNITIES TO CREATE, PRODUCE, LEARN, EXPRESS AND CONNECT."

MAGDA ESCOBAR, EXECUTIVE DIRECTOR, PLUGGED IN

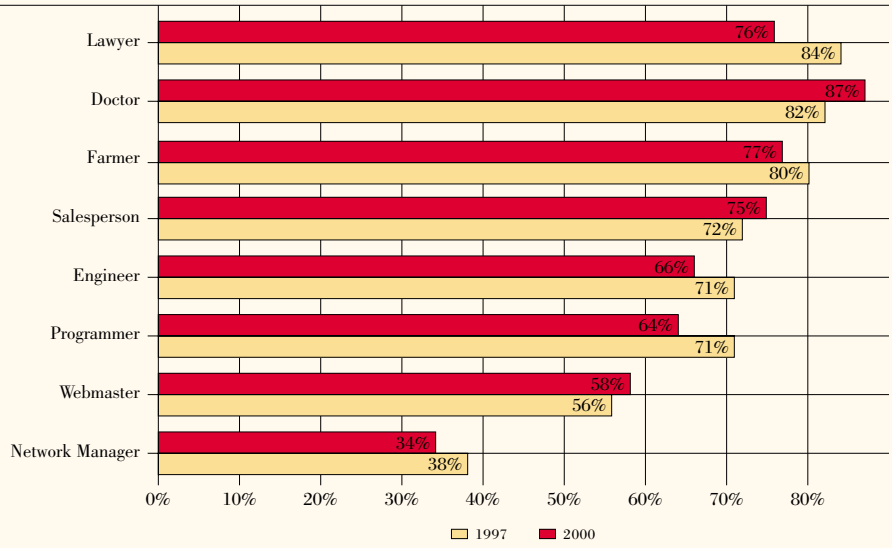
[6] The UCLA Internet Report: "Surveying the Digital Future," UCLA Department of Communication Policy, November 2000.

STUDENT AWARENESS OF TECHNOLOGY CAREERS

Although Silicon Valley students are very tech-savvy with regard to computer access and usage, an analysis of the student survey data suggests that—even following an unprecedented boom in the high-tech industry—8th- and 11th-grade students have a much higher awareness of traditional careers than of technology careers. Furthermore, a comparison of data from A.T. Kearney's 1997 and 2000 student surveys suggests that student awareness of high-tech careers essentially remained unchanged—and, in the case of "engineer" and "programmer," may have actually decreased—during that three-year period.

DESPITE THE INTERNET EXPLOSION OF THE LATE 1990S, STUDENT AWARENESS OF HIGH-TECH OCCUPATIONS LAGS BEHIND THAT OF MORE TRADITIONAL CAREERS.

STUDENTS' AWARENESS OF SELECTED CAREERS



Note: Familiarity level is the percentage of students reporting that they either "sort of understand" or "completely understand" that particular profession.
Source: A.T. Kearney, Student Survey

Overall, 73 percent of Silicon Valley students reported having some understanding of at least two high-tech occupations. However, the survey data indicate that the awareness level among Hispanic students is lower than among their peers. Sixty-one percent of Hispanic students reported having some understanding of two or more high-tech careers, a much lower percentage than White students (76 percent), Asian students (79 percent) and African American students (80 percent).

"MANY STUDENTS DO NOT HAVE SUFFICIENT EXPOSURE TO CAREERS IN THE NEW ECONOMY. BY BRINGING STUDENTS AND EMPLOYERS TOGETHER, WE CREATE A DYNAMIC LEARNING ENVIRONMENT THAT LINKS CLASSROOMS TO REAL-WORLD LEARNING AND CAREER OPPORTUNITIES."

COLLEEN B. WILCOX, SUPERINTENDENT, SANTA CLARA COUNTY OFFICE OF EDUCATION

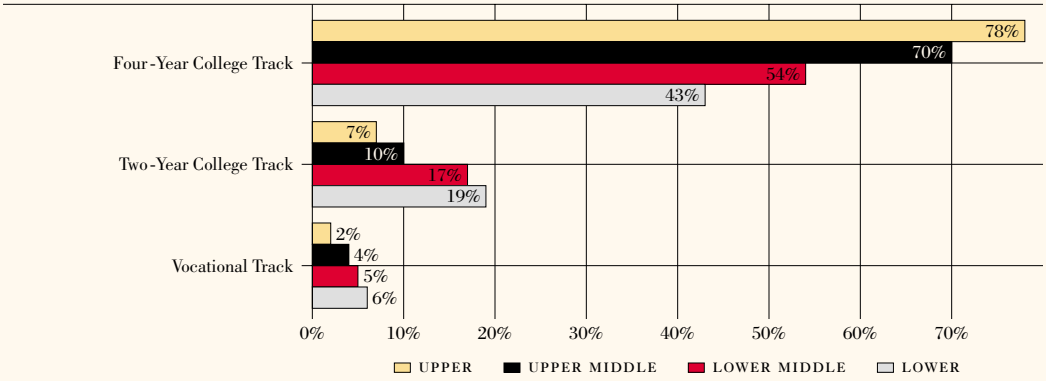
STUDENT PREPAREDNESS FOR TECHNOLOGY CAREERS

As noted in the description of the technology acclimation framework (page 9), "preparedness" in the case of K–12 students is defined as the *intent* to prepare—that is, the intent to obtain the skills needed to use technology in a work setting. For the purposes of our analysis, "intent to prepare" encompasses the intent to undertake any of the major types of postsecondary education: four-year colleges, two-year colleges and vocational programs. There are several reasons for this rather expansive definition of preparedness. First, many non-technical, non-managerial positions—such as many positions in administration and sales—do not require a four-year college degree. Moreover, California's community college system has worked in recent years to expand its capacity to train technology workers. Finally, as Silicon Valley continues to move from a manufacturing-based economy to an information-based economy, there will be a growing demand for workers with the types of non-technical skills (e.g., content knowledge across disciplines, critical thinking) and "soft" skills (e.g., collaborative problem-solving, communication) that may be gained outside of technical/engineering programs or majors.

According to the survey of Silicon Valley junior high and high school students, more than three-quarters (82 percent) plan to pursue postsecondary education, which suggests a high overall level of preparedness among area students. Sixty-six percent of students plan to study at a four-year college, while 12 percent plan on a two-year college (i.e., associate's-degree-granting institution) and 4 percent intend to pursue vocational programs.

The survey data also suggest that students from higher socioeconomic backgrounds are more likely to plan on entering a four-year college. Since higher educational attainment is typically associated with higher earnings and increased labor market mobility, this finding raises the possibility that students in lower socioeconomic segments may be less likely to obtain the type of education needed for the higher-paying jobs in technology fields.

STUDENTS' INTENT TO PREPARE, BY SOCIOECONOMIC STATUS



Note: Socioeconomic status is a combination of household income and educational attainment. Because students were not asked to report their household income, our analysis used the median household income for the student's ZIP code of residence.

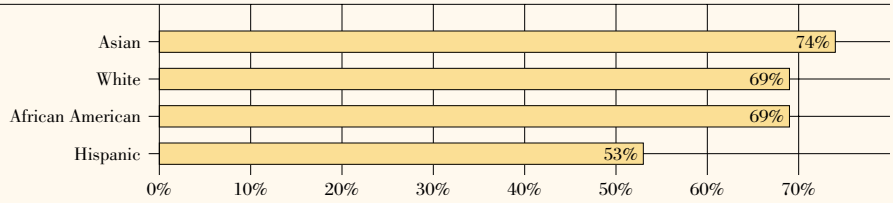
Source: A.T. Kearney, Student Survey

MORE THAN 80 PERCENT OF SILICON VALLEY STUDENTS PLAN TO PURSUE SOME TYPE OF POSTSECONDARY EDUCATION OR TRAINING, THOUGH THERE IS SOME VARIATION ACROSS SOCIOECONOMIC SEGMENTS.

The survey data also show that plans for postsecondary education vary among ethnic groups, with Hispanic students being the least likely to plan on a four-year college. Fifty-three percent of Hispanic students intend to enter a four-year college, compared with 74 percent of Asian students, 69 percent of African American students and 69 percent of White students. This finding is consistent with data reported in Joint Venture's *2001 Index of Silicon Valley*, which showed that the high school graduation rate of Hispanic students is lower than for students in any other ethnic group. Furthermore, the *2001 Index* showed that among high school graduates in Silicon Valley, Hispanic students are the least likely of any group to have completed the courses required for entrance into the University of California (UC) or California State University (CSU) system.

HISPANIC STUDENTS ARE LESS LIKELY THAN THEIR PEERS TO PLAN ON ATTENDING A FOUR-YEAR COLLEGE.

STUDENTS' INTENT TO PREPARE, BY ETHNICITY



Note: Percentage of students who plan to attend a four-year college.
Source: A.T. Kearney, Student Survey

"THE DIGITAL DIVIDE IS NOT JUST ABOUT ACCESS TO TECHNOLOGY. IT'S ABOUT ACCESS TO EDUCATION AND CAREERS."

ROBERT CARET, PRESIDENT, SAN JOSE STATE UNIVERSITY

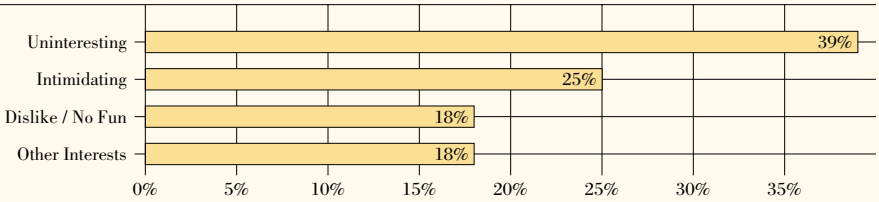
STUDENT INTEREST IN TECHNOLOGY CAREERS

The student survey data indicate that there is a sizable gap between student *awareness* of technology professions and student *interest* in technology-related careers. As shown in the technology acclimation framework overview graph (page 11), 73 percent of students reported an awareness of high-tech careers. An estimated 32 percent of students are interested in pursuing technology- or computer-related careers,[7] for an "interest gap" of just over 40 percentage points. Students who did not indicate a desire to pursue technology careers cited a variety of reasons, such as that they found such careers uninteresting or intimidating, they disliked computers, or they had other interests.

[7] To estimate the overall percentage of students who are interested in pursuing computer-related careers, this analysis took the midpoint between two data points: the percentage of students who identified a technology job as their "dream job" (20 percent) and the percentage of students who want to work in a technology- or computer-related job (44 percent).

MANY STUDENTS BELIEVE THAT HIGH-TECH CAREERS ARE UNINTERESTING OR INTIMIDATING.

MOST FREQUENTLY CITED REASONS FOR NOT BEING INTERESTED IN TECHNOLOGY CAREERS



Note: Percentages indicated are as a proportion of students who had reported not wanting to work in a technology- or computer-related job.
Source: A.T. Kearney, Student Survey

The considerable drop-off between student awareness of high-tech careers and student interest in these careers is not entirely surprising. Public perception, shaped in large part by the news and entertainment media, is that technical professionals such as engineers, programmers and computer scientists are intelligent, but often socially awkward and absent-minded.[8] These basic preconceptions were echoed in the student surveys, on which respondents tended to associate images of technology workers with bow ties, "flood pants," thick-framed glasses and pocket protectors. Survey respondents also described engineers and scientists as obsessed with work, never leaving their desks or laboratories, and having no time for hobbies or outside interests.

These negative images suggest that student interest in technology careers could perhaps be increased by providing students with more accurate and balanced information about technology professionals. At the same time, because career interests are shaped by a variety of factors (several of which are discussed in later in this report), any meaningful effort to boost student interest in high-tech would need to encompass a variety of strategies.

"PEOPLE WORKING WITH COMPUTERS DON'T REALLY HAVE A LIFE."

11TH-GRADE SURVEY RESPONDENT

"COMPUTERS ARE TOO COMPLICATED AND HARD TO LEARN."

11TH-GRADE SURVEY RESPONDENT

"I DON'T WANT TO SIT IN FRONT OF A COMPUTER ALL DAY."

8TH-GRADE SURVEY RESPONDENT

"COMPUTERS ARE PRETTY BORING."

11TH-GRADE SURVEY RESPONDENT

8 *Land of Plenty: Diversity as America's Competitive Edge in Science, Engineering and Technology*, Report of the Congressional Commission on the Advancement of Women and Minorities in Science, Engineering and Technology Development, September 2000.

THE STUDENT GENDER DIVIDE

While the previous sections have focused on what the student survey tells us about Silicon Valley junior high and high school students as broken down by socioeconomic or ethnic backgrounds, it is important to note that the survey data point to clear gender differences at certain stages of technology acclimation.

First, while female students and male students have similar levels of awareness with regard to traditional careers, there is a slight gender gap in awareness of high-tech careers. Only 68 percent of female students reported some familiarity with at least two high-tech occupations, compared to 78 percent of male students. This difference in awareness exists despite the fact that female and male students have equal levels of computer access and usage.

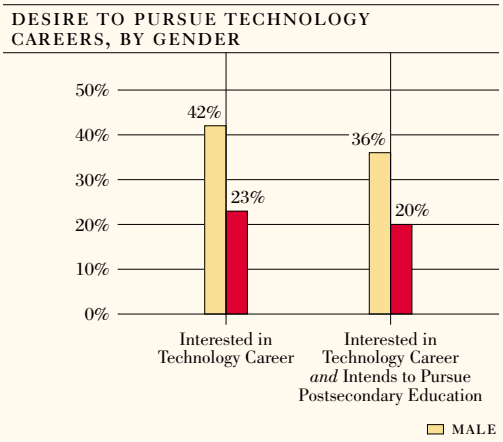
At the same time, there is an even more significant gender divide with regard to *interest* in high-tech careers. Survey data show that, compared to males with similar postsecondary education plans and similar levels of computer usage, females were only about half as likely to report wanting to pursue a high-tech career. In addition, only 1 in 10 female students named high-tech careers as their "dream job," compared to 3 in 10 male students.

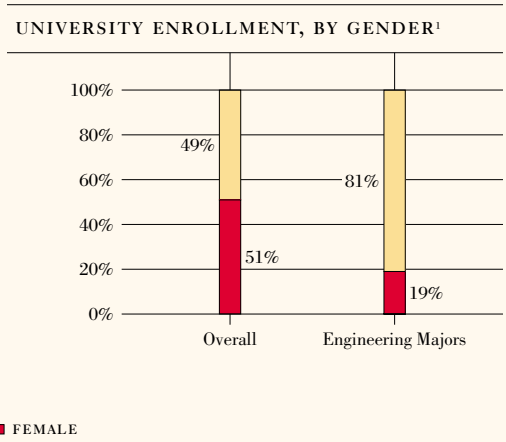
The most common reason that female students offered for not wishing to pursue technology careers was what they view as the uninteresting nature of the field. This finding is consistent with the conclusions of an American Association of University Women (AAUW) study on female attitudes toward information technology.[9] AAUW found that "girls are not computer-phobic, they are 'computer-reticent,' asserting a 'we can, but [we] don't want to' attitude toward technology. When asked, they most often express the view that computing involves work that is 'tedious, sedentary and—most critically—antisocial.'"

Given the relative lack of interest in high-tech careers among female junior high and high school students, it is not surprising that women are far less likely than men to pursue technology-related degrees when they get to college. According to the AAUW study, since 1984 the share of computer science bachelor's degrees received by women has decreased from 37 percent to less than 28 percent, thus making computer science the only field in which women's participation has *decreased* over time. Similarly, a report issued by Women of Silicon Valley indicated that "women's share of engineering degrees from local institutions has stalled at 20 percent since 1990" and that their share of computer science degrees declined from 33 percent in 1988 to 29 percent in 1997.[10] According to fall 2000 enrollment figures at San Jose State University, women accounted for 51 percent of the student population but only 19 percent of engineering majors.

Clearly, bridging this gender divide will require concentrated efforts not only to increase female students' awareness of and interest in technology careers, but also to encourage more college-bound women to choose computer science and engineering majors.

[9] *Tech-Savvy: Educating Girls in the New Computer Age,* AAUW Educational Foundation, 2000.
[10] *Unfinished Business: Women in the Silicon Valley Economy,* Women of Silicon Valley, April 2001.





COMPARED WITH MALE STUDENTS, FEMALE STUDENTS HAVE SIGNIFICANTLY LESS INTEREST IN HIGH-TECH CAREERS.

Note: [1] Undergraduate enrollment in San Jose State University, Fall 2000.

Sources: A.T. Kearney, Student Survey; Office of Institutional Planning and Academic Resources, San Jose State University; AAUW Education Foundation

"HP HAS A PHENOMENAL HISTORY OF FOCUSING ON EMPOWERMENT, ACCESS AND INCLUSION. WE ARE WORKING HARD TO EXTEND THE BENEFITS OF THE DIGITAL AGE TO EVERYONE, EVERYWHERE."

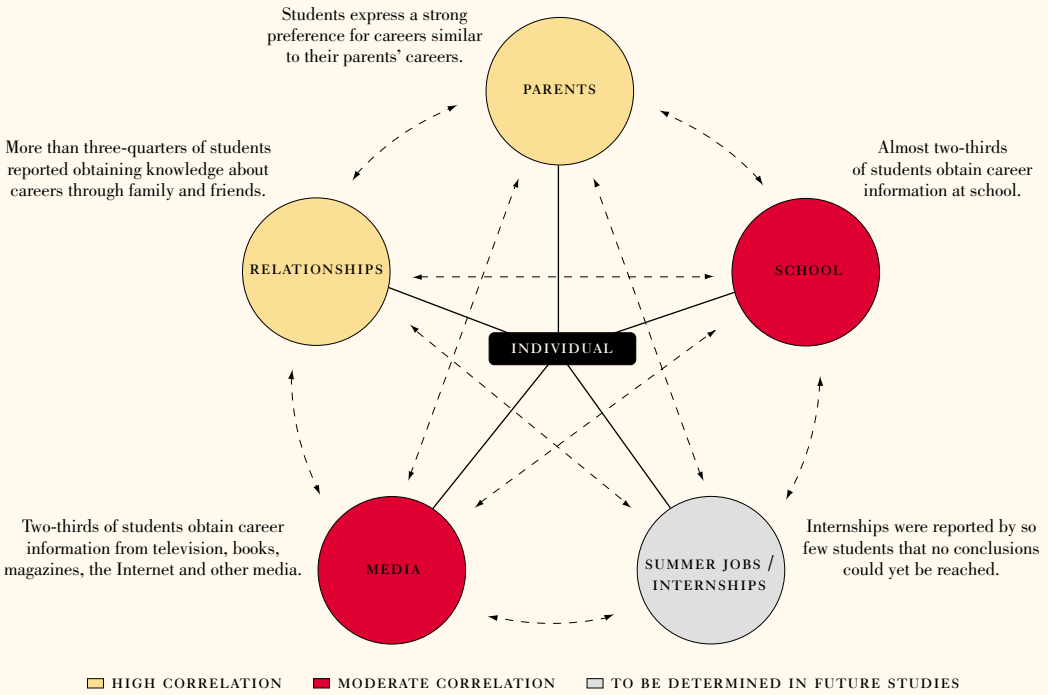
DEBRA DUNN, VICE PRESIDENT, STRATEGY AND CORPORATE OPERATIONS, HEWLETT-PACKARD

Social Networks and Students' Career Interests

In order to gain a deeper understanding of students' propensity to pursue technology careers, our analysis now turns to an examination of the social influences that play a part in shaping students' career interests. Needless to say, the factors that affect an individual's career goals and interests are various and complex. This analysis looks at students' social networks as a driver of career interests. Components of a student's social network include parents' careers and backgrounds; relationships with family and friends; school; media; and internships and summer jobs. It is important to note that other important drivers of career interests—most notably, personal characteristics such as aptitude and achievement—are beyond the scope of this report. Still, a thorough assessment of the role of social networks can be valuable in helping to illuminate the ways in which young people learn about, develop and pursue career interests.

An analysis of student surveys indicates that two facets of the social network are especially important in shaping students' career interests. First, students tend to show a strong preference for careers that are similar to their parents' careers. In addition, students cited relationships with family and friends as their primary source of career information. The student survey results also suggest that most students gain additional knowledge of careers through school and the mass media (television, books, magazines and the Internet), while summer jobs and internships appear to be an infrequent—and perhaps underutilized—way for students to learn about different careers. What follows is a more detailed discussion of the key components of students' social networks.

SOCIAL NETWORK FOR TECHNOLOGY ACCLIMATION



Source: A.T. Kearney, Student Survey

"SOCIAL NETWORKS THAT CAN BRIDGE ACROSS GEOGRAPHY, RACE AND CLASS ARE KEY TO SUCCESS IN THE NEW ECONOMY. 'HARD' SKILLS ARE ESSENTIAL, BUT IT'S THE CONNECTIONS AND MENTORING THAT PROVIDE INFORMATION ABOUT WHAT SKILLS ARE NECESSARY AND A VISION OF HOW ACQUIRING THEM CAN LEAD TO NEW OPPORTUNITIES FOR ALL OUR RESIDENTS."

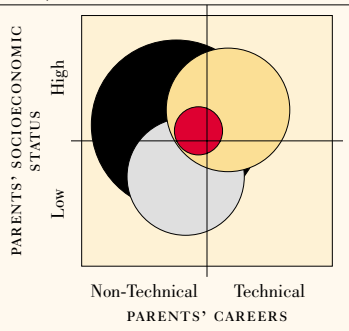
MANUEL PASTOR, JR., PROFESSOR, UNIVERSITY OF CALIFORNIA, SANTA CRUZ

INFLUENCE OF PARENTS

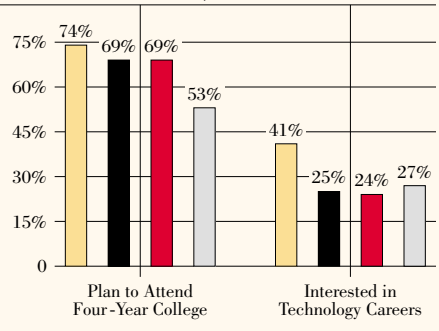
Parents are often the defining element of a student's social network, exerting a unique and powerful influence on his or her values, goals and interests. An analysis of the student survey data underscores the considerable impact that parents have on students' career interests, as it shows a strong connection between parents' careers and socioeconomic standing and their children's career interests. Students whose parents are in the higher socioeconomic groups tend to be interested in careers that are similar to that of their parents and also are more likely to pursue postsecondary education. That is, students whose parents are both in professions *outside* of high-tech (e.g., doctor, nurse, lawyer, accountant, teacher, manager, architect) are more likely to express an interest in non-high-tech professions, while students whose parents are both in high-tech professions are more likely to be interested in technology careers.

Through further analysis that takes students' ethnic backgrounds into account, we find that parents' socioeconomic status appears to be highest among Asian students, followed by Whites, African Americans and Hispanics. In addition, the survey data reveal that parents of Asian students are the most likely to be working in high-tech careers, with 38 percent of Asian students having parents who are high-tech professionals. Looking at both student intent to prepare and career interest, we discover that intended levels of preparedness—as reported by students of each group—follow a pattern roughly analogous to that seen in parents' socioeconomic status. As reported earlier (page 16), Asian students had the highest percentage planning to pursue a four-year college education (74 percent), followed by African American and White students (both 69 percent), and then Hispanic students (53 percent). At the same time, students' interest in high-tech careers mirrors the pattern of the parents' careers—most notably insofar as Asian students' interest in high-tech far outpaces that of the other groups.

PARENTS' CAREERS AND SOCIOECONOMIC STATUS, BY ETHNICITY[1]



STUDENTS' PREPAREDNESS FOR AND INTEREST IN HIGH-TECH CAREERS, BY ETHNICITY



ASIAN STUDENTS—MOST OF WHOSE PARENTS ARE IN THE HIGHER SOCIOECONOMIC SEGMENTS AND WORK IN HIGH-TECH—REPORT HIGHER INTEREST IN TECHNOLOGY CAREERS AND ARE MORE LIKELY TO PLAN ON A FOUR-YEAR COLLEGE.

ASIAN WHITE AFRICAN AMERICAN HISPANIC

Note: In determining socioeconomic status, income was estimated using the median household income for the student's ZIP code of residence.
[1] Size of circle represents size of population.

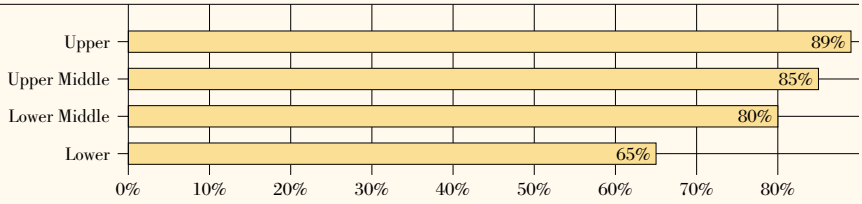
Source: A.T. Kearney, Student Survey

INFLUENCE OF PERSONAL RELATIONSHIPS

Students gain much of their knowledge about jobs and careers through personal relationships with family and friends. According to the student survey, more than three-quarters (83 percent) of students indicated that they rely on family and friends for information on jobs and careers. The survey results also show that students with parents in lower socioeconomic segments report less reliance on personal relationships for job and career information. This finding is consistent with a growing body of research on social networks and economic opportunity, which shows that low-income individuals have less access to the types of personal connections that provide career information and facilitate upward mobility.[11] At the same time, students in higher socioeconomic segments may be more likely to seek out career information through personal relationships as a result of having easy access (through parents, parents' friends and colleagues, relatives, and others) to people who can help advance their careers.

MORE THAN THREE-QUARTERS OF STUDENTS RELY ON PERSONAL RELATIONSHIPS FOR CAREER-RELATED INFORMATION.

INFLUENCE OF PERSONAL RELATIONSHIPS, BY SOCIOECONOMIC STATUS



Note: In determining socioeconomic status, income was estimated using the median household income for the student's ZIP code of residence.
Source: A.T. Kearney, Student Survey

"BY CONNECTING YOUNG PEOPLE TO CARING ADULT MENTORS AND ROLE MODELS, WE CAN DARE STUDENTS TO DREAM AND INSPIRE THEM TO ACHIEVE THE ACADEMIC SUCCESS THAT WILL PREPARE THEM FOR BETTER LIFE OPPORTUNITIES AND GOOD CAREERS."

RON GONZALES, MAYOR, CITY OF SAN JOSE

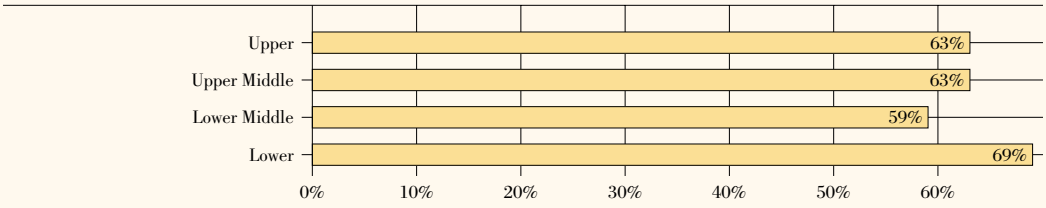
[11] See, for example, pages 24-25 of *Building Community: Social Connections and Civic Involvement in Silicon Valley, Preliminary Findings Report, February 27, 2001*. Prepared by Center for Science, Technology & Society, Santa Clara University; and Collaborative Economics. (Research sponsored by Peninsula Community Foundation, Community Foundation Silicon Valley, and John F. Kennedy School of Government, Harvard University.)

INFLUENCE OF SCHOOL

Survey data indicate that almost two-thirds (63 percent) of Silicon Valley students gain information about careers at school, and there was only minor variation in this measure across socioeconomic segments. However, among students in the lower socioeconomic segment *only*, the percentage that reported school as a source of career information (69 percent) was slightly higher than the percentage of those obtaining this information through personal relationships (65 percent) and the media (62 percent). This suggests that, compared with other students, students in the lower economic segment are more likely to identify school as their primary source of job and career information.

ALMOST TWO-THIRDS OF STUDENTS GAIN CAREER-RELATED INFORMATION THROUGH SCHOOL.

INFLUENCE OF SCHOOL, BY SOCIOECONOMIC STATUS



Note: In determining socioeconomic status, income was estimated using the median household income for the student's ZIP code of residence.
Source: A.T. Kearney, Student Survey

Analysis of survey data also shows that students attending high-performance schools (i.e., schools with a rating of 8 or higher (out of 10) on the 1999 California Academic Performance Index) reported greater interest in technology careers than did students attending low-performance schools.[12] While high-performance schools cannot be said—on the basis of this analysis—to *cause* increased student interest in technology careers, this finding suggests that the relationship between school environment and career interest might merit additional study in the future.

[12] Created by the Public Schools Accountability Act (1999) and overseen by the California Department of Education, the California Academic Performance Index uses standardized tests and other indicators to quantify the academic performance and progress of schools.

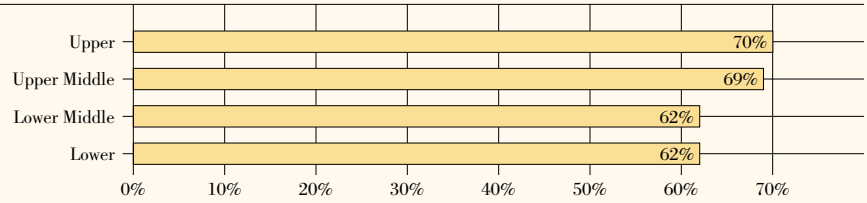
INFLUENCE OF THE MEDIA

Mass media—television, films, books, magazines, the Internet—play a significant role in shaping the career interests of Silicon Valley students, with two-thirds (66 percent) of students identifying media as a source of information on jobs and careers. While the survey did not assess specifically *how* exposure to the media influences students' interest in high-tech careers, a variety of secondary sources suggest that media images do little to encourage—and may actually discourage—student interest in pursuing technology careers:

- A 1998 study issued by Information Technology Association of America claimed that students embrace negative stereotypes of information technology (IT) professionals, due in large part to unflattering mass media depictions of IT professionals.
- A 1998 Harris Poll, commissioned by the American Association of Engineering Societies, found that 69 percent of U.S. residents believe news media coverage of the engineering field is either "fair" or "poor."
- According to a 2000 National Science Foundation report, the mass media—in addition to perpetuating distorted, negative images of scientists and engineers—rarely feature images of female scientists or scientists from minority populations.

TWO-THIRDS OF SILICON VALLEY STUDENTS OBTAIN JOB- OR CAREER-RELATED INFORMATION FROM THE MEDIA, WHICH SOME SOURCES CLAIM PRESENT UNREALISTIC IMAGES OF TECHNOLOGY WORKERS.

INFLUENCE OF MEDIA, BY SOCIOECONOMIC STATUS



Note: In determining socioeconomic status, income was estimated using the median household income for the student's ZIP code of residence.
Source: A.T. Kearney, Student Survey

"WE NEED TO HAVE THE BEST AND THE BRIGHTEST IN THE INDUSTRY GO AND TEACH FOR A YEAR OR TWO. IF YOU EXPOSE STUDENTS TO REAL PEOPLE IN HIGH-TECH, ROLE MODELS THAT ARE PASSIONATE ABOUT WHAT THEY DO, THAT WILL MOTIVATE THEM."

DAN WALKER, CHIEF TALENT OFFICER, APPLE

Call for Discussion

The findings presented in this study point to an array of issues that Silicon Valley must address in order to fully develop its pool of local talent in a way that fosters widespread opportunity. In moving forward on these issues, all the key stakeholders—students, parents, educators, business leaders, community organizations and public officials—must contribute their ideas, knowledge and guidance. This Call for Discussion aims to provide a framework for a meaningful dialogue among these various groups. Here we recap the study's key findings and present a series of questions intended to promote coordinated efforts and lead to creative solutions.

TECHNOLOGY ACCESS AND USAGE

KEY FINDINGS	ISSUES FOR DISCUSSION
• Access and usage are very high among Silicon Valley students as whole. • Students from lower-income families are less likely to have home access to computers. • Home access to computers is less common among Hispanic students (69 percent with home access) and African American students (80 percent) than among their White and Asian counterparts (both 94 percent).	• Is there a relationship between the type of access a student has (i.e., at home, at school, at a library or community center) and the type of educational benefits the student gains from computer and Internet use? • Do students from different income or ethnic groups derive different types of educational benefits from technology use? • What types of support do students need in order to maximize the educational and developmental benefits of technology use?

STUDENT AWARENESS OF AND INTEREST IN TECHNOLOGY CAREERS

KEY FINDINGS	ISSUES FOR DISCUSSION
• Student awareness of high-tech careers lags behind awareness of more traditional professions. • There is a significant drop-off between student awareness of high-tech careers and student interest in these careers. • The awareness level among Hispanic students is lower than among their peers. Sixty-one percent of Hispanic students reported having some understanding of two or more high-tech careers, compared with 76 percent of White students, 79 percent of Asian students and 80 percent of African American students. • There is a clear gender gap with regard to student awareness of and interest in technology careers. Females are only about half as likely as males to report wanting to pursue a high-tech career.	• How can we build better awareness among students concerning the broad diversity of career opportunities in Silicon Valley's technology sector? • How can we help all students to better understand the link between technology careers and the benefits such careers produce for society? • What are ways of dispelling negative stereotypes of high-tech workers? How can we ensure that students have accurate information on technology occupations? • How can we help Hispanic students increase their awareness of technology careers? • What are strategies for increasing female students' awareness of and interest in high-tech careers? How can we improve female

STUDENT AWARENESS OF AND INTEREST IN TECHNOLOGY CAREERS (CONTINUED)

KEY FINDINGS	ISSUES FOR DISCUSSION
	students' general perception of computing and technology? • What role can the business community play in educating students about long-term career paths in technology-related fields?

STUDENT PREPAREDNESS

KEY FINDINGS	ISSUES FOR DISCUSSION
• Eighty-two percent of Silicon Valley students plan to pursue some type of postsecondary education: 66 percent plan to attend a four-year college, 12 percent plan to attend a two-year college and 4 percent plan to pursue a vocational program. • Students from higher socioeconomic backgrounds are more likely to plan on attending a four-year college. • The proportion of Hispanic students planning to attend a four-year college (53 percent) is considerably lower than that of Asian (74 percent), African American (69 percent) and White students (69 percent).	• How can we encourage more Hispanic students and more students from low socioeconomic backgrounds to pursue four-year degrees? • What will "preparedness" mean for the 21st-century economy? How can we help students to better acquire the skills that will be in demand in the future labor market? • How we can help students better understand the types of academic courses and curricula that will prepare them for technology-related careers? • How can we ensure that schools are adequately funded to provide students *and teachers* with the necessary skills, resources and opportunities with regard to technology use? • How can the region's various stakeholders work together to attract and retain a skilled, fully certified teacher workforce? • How can we ensure that all schools have the necessary resources for computer maintenance and support? What type of leadership can businesses play in this matter? • What role can postsecondary institutions play in encouraging more students to pursue technology-related careers—for example, by increasing the flexibility of engineering schools' curricula?

STUDENTS' SOCIAL NETWORKS

KEY FINDINGS	ISSUES FOR DISCUSSION
• There is a strong connection between parents' careers and socioeconomic standing and their children's career interests. Students whose parents are in higher socioeconomic groups tend to be interested in careers that are similar to those of their parents. • More than three-quarters (83 percent) of students obtain job and career information through family and friends, although students from lower socioeconomic backgrounds are far less likely to rely on personal relationships for this information. • Almost two-thirds (63 percent) of students reported that they receive career information at school. Two-thirds (66 percent) of students gain career information from the mass media, which—according to outside research—typically present unflattering and unrealistic images of technology workers.	• How can we help all students—and especially students from low-income families—establish new personal connections and networks that increase their awareness of different careers and foster upward mobility? What types of programs—mentoring, internships and others—can help students establish these types of connections? • How can businesses help get their employees involved as volunteers with after-school or mentoring programs? • How can we support educators and counselors to increase their awareness and understanding of high-tech careers? • How can we work with the media to promote better coverage and more accurate images of technology professionals?

There is also a set of broader questions that cut across those presented above: Are there proven models from other parts of the nation that Silicon Valley can learn from and emulate? What public and private institutions can provide leadership on specific issues? How can the business community be engaged to take an active role in addressing the challenges identified in the study? What additional research and information are needed in order to meet these challenges? Addressing these various questions represents an important first step toward a multifaceted regional plan for building a diverse and skilled local labor force.

JOINT VENTURE: SILICON VALLEY NETWORK is a regional, non-partisan voice and a civic catalyst for solutions to problems that impact all sectors of the community. Joint Venture brings together established and emerging leaders from business, labor, government, education and community organizations. It also involves citizens in the region and is a neutral forum for new ideas and creative solutions. Real benefits for people, business and community organizations are our goals.

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