Disability Statistics Abstract

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Disability and the Digital Divide

by H. Stephen Kaye

Americans with disabilities are less than half as likely as their non-disabled counterparts to own a computer, and they are about one-quarter as likely to use the Internet. These are the conclusions of a new report[1] on computer ownership and Internet use among people with disabilities, based on December 1998 data from the Current Population Survey, a nationally representative sample of U.S. households. For the purpose of this analysis, disability is defined in terms of a limitation in the ability to work. Those respondents reported to have a "health problem or disability which prevents them from working or which limits the amount or kind of work they can do" are counted as having a disability. The statistics presented in this abstract apply to the population 15 years of age or older.

Computer technology and the Internet have the tremendous potential to broaden the lives and increase the independence of people with disabilities. To a population that is often physically as well as socially isolated, they can offer access to information, social interaction, cultural activities, employment opportunities, and consumer goods. Screen readers can provide blind people with instant access to vast quantities of online information, without having to wait for Braille or audiotape; voice recognition can enable people with limited manual dexterity to write letters, manage their finances, or perform work-related tasks. But, as the data in this abstract demonstrate, very few people with disabilities are able to take advantage of these possibilities.

DSC

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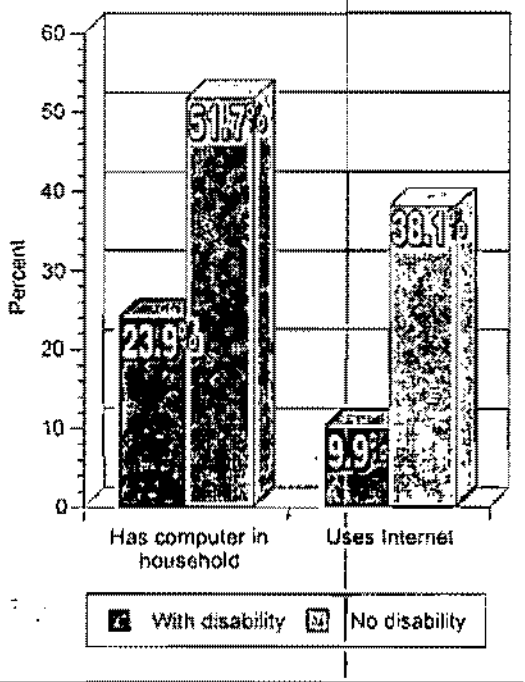
Figure 1:
Computer ownership and Internet use, by disability status



As shown in Figure 1, just under one-quarter (23.9 percent) of people with disabilities have access to a computer at home, compared to just over half (51.7 percent) of their non-disabled counterparts. The gap in Internet use is even more striking: Only one-tenth (9.9 percent) of people with disabilities connect to the Internet, compared to almost four-tenths (38.1 percent) of those without disabilities.

Elderly people with disabilities are particularly unlikely to make use of these technologies. Among persons 65 years of age or older, only one-tenth (10.6

percent) of those with disabilities have computers at home, compared to one-quarter (25.3 percent) of those without disabilities. And only a tiny fraction (2.2 percent) of elderly people with disabilities use the Internet, a rate about one-quarter that of the non-disabled elderly population (8.9 percent).

Among the non-elderly (aged 15–64), the gaps in access to these technologies are less dramatic but still pronounced: 32.6 percent of those with disabilities have computers and 15.1 percent use the Internet, compared to 55.6 percent and 42.3 percent, respectively, of their counterparts without disabilities.

Educational attainment

The more education a person has, the more likely he or she is to own computer equipment and to use it to connect to the Internet. But regardless of the level of educational attainment, people with disabilities have much lower rates of computer ownership and Internet use than their non-disabled peers (Figure 2).

Only one-eighth (12.7 percent) of people with disabilities who have not graduated from high school own computers. This figure compares with one-third (34.5 percent) of non-high-school-graduates and one-half (49.0 percent) of high school graduates without disabilities, almost half (46.5 percent) of college graduates *with* disabilities, and three-quarters (73.4 percent) of college graduates *without* disabilities.

Only 2.4 percent of people with disabilities who lack high school diplomas use the Internet. Those without disabilities are almost 10 times as likely to connect to the Internet (22.5 percent). People with disabilities who have college degrees have still higher rates of Internet use (30.2 percent); but even this figure is less than half that for college graduates without disabilities, almost two-thirds (63.9 percent) of whom are Internet users.

Family income

People with and without disabilities who have low incomes are much less likely to have access to computer technology than are those with greater financial resources (Figure 3). But regardless of income, people with disabilities own computers significantly less often than do their non-disabled counterparts: half as often for persons with family incomes under $20,000 per year (11.0 percent vs. 22.2 percent), and two-thirds as often for those with family incomes of $20,000 or more (40.0 vs. 61.2 percent).

Within both income groups, use of the Internet also varies significantly by disability status. Only 4.9 percent of people with disabilities who have low family incomes use the Internet, compared to almost four times as high

Figure 2:
Computer and Internet use, by disability status and educational attainment, ages 15 and over

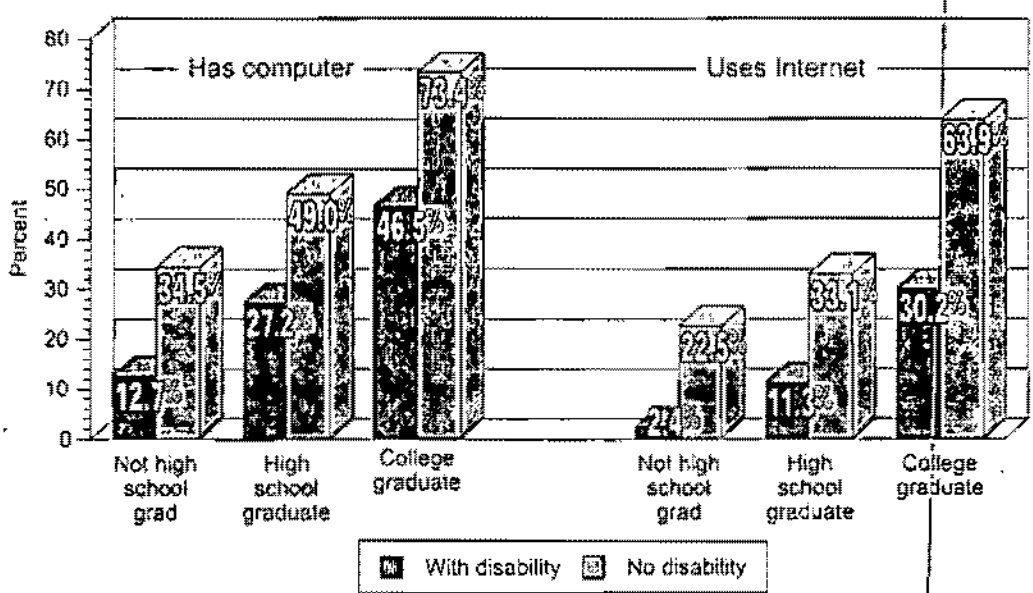
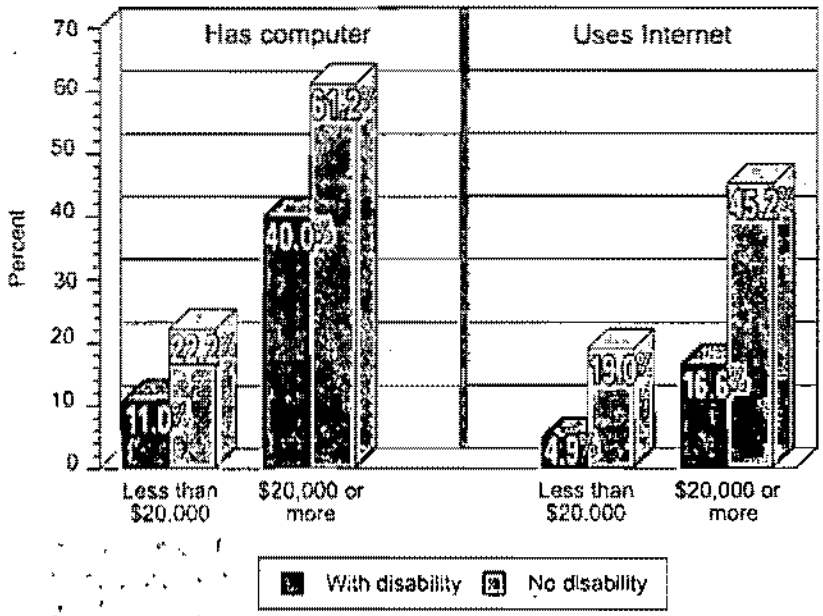


Figure 3:
Computer and Internet use, by disability status and family income, ages 15 and over



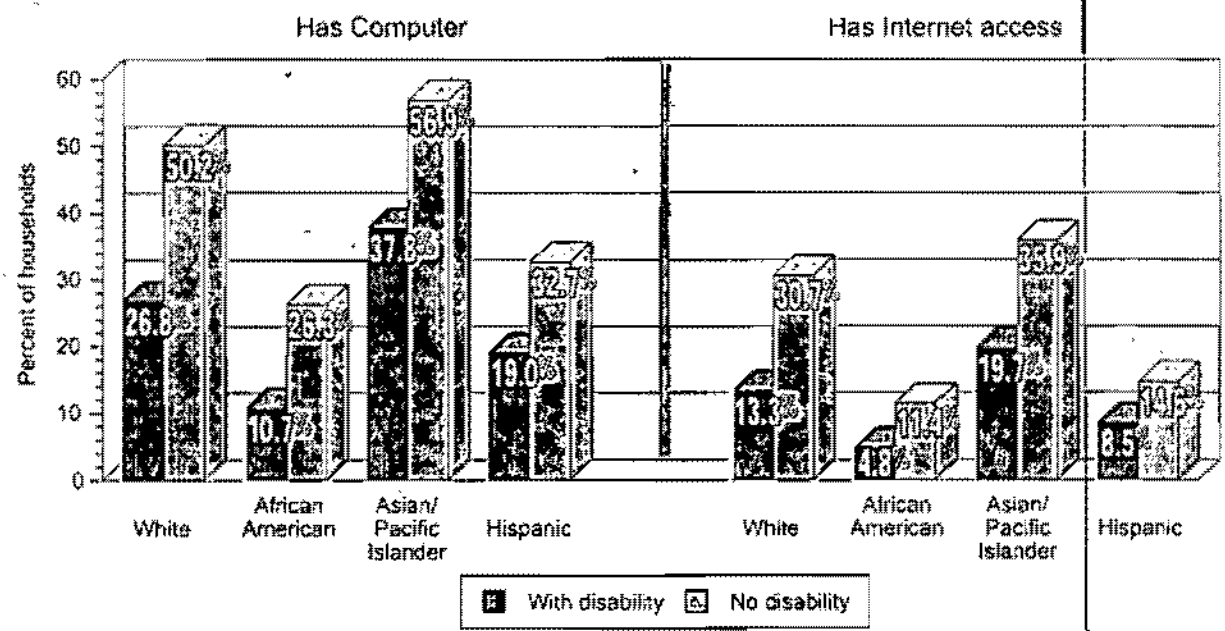
a proportion (19.0 percent) of the non-disabled population. Among people with moderate or high incomes, 16.6 percent of those with disabilities and 45.2 percent of those without disabilities connect to the Internet.

Race and ethnicity

Figure 4 presents statistics on *household* computer ownership and Internet access, broken down into racial and ethnic categories. The race and ethnicity of a household is determined by that of the person in whose name the dwelling is owned or rented; when a household contains one or more members with a disability, it is classified as a household with a disability.

Within each racial and ethnic group, the rate of computer ownership is much less when there is a disability present in the household than when there is not.[3] Among white households, those with dis-

Figure 4:
Household computer ownership and Internet access, by race/ethnicity and disability status of household members



abilities are about half as likely to own computers as are those without (26.8 vs. 50.2 percent). Among African American households, only one-tenth (10.7 percent) of those with disabilities have computers, compared to one-quarter (26.3 percent) of households having no members with disabilities. Some 37.8 percent of Asian and Pacific Islander households with disabilities have computers, compared to 56.9 percent of those without disabilities. And among Latino households, 19.0 percent of those with disabilities have computers, versus 32.7 percent of those with no disability.

There are also large gaps in Internet access within the racial categories.[3] Across the board, households having members with disabilities are roughly half as likely to be connected to the Internet as those with no members with disabilities (for white households, 13.3 vs. 30.7 percent; for black households, 4.8 vs. 11.4 percent; for Asian/Pacific Islander households, 19.7 vs. 35.9 percent).

Among those households with disabilities, African American households are much less likely than white households to have a computer (10.7 vs. 26.8 percent) or to have access to the Internet (4.8 vs. 13.3 percent).[4] It is worth noting that the rates for white households *with* disabilities (26.8 percent of which have computers and 13.3 percent of which have access to the Internet) are roughly equal to those of African American households *without* disabilities (26.3 and 11.4 percent, respectively). Thus, disability and race can be seen to be equally significant factors in determining the household's likelihood of exposure to computer technology.

Notes

[1] Kaye, H.S. (2000). Computer and Internet Use Among People with Disabilities. *Disability Statistics Report (13)*. Washington DC: U.S. Department of Education, National Institute on Disability and Rehabilitation Research.

[2] Because of the small sample size of Native Americans with disabilities, data on computer ownership and Internet use among this population are statistically unreliable and have not been presented in this abstract.

[3] Among Latinos, the difference in Internet access rates between those with and without disabilities is not statistically significant.

[4] Among households with disabilities, differences between whites and Asian/Pacific Islanders and between people of Hispanic and non-Hispanic origin are not statistically significant.

Credits

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Computer and Internet Use Among People with Disabilities

by

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March, 2000

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CONTENTS

INTRODUCTION

Computer technology and the Internet have a tremendous potential to broaden the lives and increase the independence of people with disabilities. Those who have difficulty leaving their homes can now log in and order groceries, shop for appliances, research health questions, participate in online discussions, catch up with friends, or make new ones. Blind people, who used to wait months or years for the information they needed to be made available in Braille or on audiotape, can now access the very same news stories, magazine articles, government reports, and information on consumer products at the very same time it becomes available to the sighted population. People who have difficulty holding a pen or using a keyboard can use the latest speech recognition software to write letters, pay their bills, or perform work-related tasks.

These new technologies hold great promise, but as this report makes abundantly clear, the computer revolution has left the vast majority of people with disabilities behind. Only one-quarter of people with disabilities own computers, and only one-tenth ever make use of the Internet. Elderly people with disabilities, and those with low incomes or low educational attainment, are even less likely to take advantage of these new technologies. African Americans with disabilities also have an especially low rate of computer and Internet use.

Extensive media coverage was devoted to a recent analysis (National Telecommunications and Information Administration, 1999) documenting huge racial and ethnic gaps in access to electronic technologies in the United States. The present report, using data from the same survey, demonstrates that gaps in computer and Internet use based on disability status are just as large as those based on race and ethnicity.

DATA SOURCE AND METHODS

The Current Population Survey (CPS) is a nationally representative survey of approximately 50,000 U.S. households each month. Conducted by the Census Bureau for the Bureau of Labor Statistics, the basic CPS questionnaire focuses on employment status and household income. The sample consists of eight panels, with a new panel brought into rotation every month. Households in each panel are interviewed eight times—for four months in a row, and then, after an eight-month break, during the same four calendar months of the following year.

Supplementary questionnaires are often included along with the basic monthly survey. The present analysis is based on data from two such supplements: the 1998 Computer and Internet Use Supplement, conducted in December of that year, and the 1999 Annual Demographic Survey, conducted three months later, in March.

The Computer and Internet Use Supplement contained questions on household computer ownership and Internet access, as well as questions on specific uses of the Internet by each household member. It was conducted for the National Telecommunications and Information Administration (NTIA) as a means of surveying the degree of penetration of computer technology in the general population. NTIA's analysis found significant gaps in access to computers and the Internet, based on factors such as family income, race and ethnicity, and educational attainment.

Disability is not mentioned in NTIA's report, because the supplement was not designed to measure computer and Internet use among people with disabilities. No questions on disability status were asked in the supplement, nor does the basic monthly survey provide any useful way of identifying a general sample of the population with disabilities.[1]

Unlike the monthly survey, however, the March demographic supplement does include a single, broad question on work disability. Respondents are asked whether anyone in the household has "a health problem or disability which prevents them from working or which limits the kind or amount of work they can do." The question provides a reasonable way of identifying a sample of persons at least 15 years of age who are limited in their ability to work. Work disability is a narrower and more problematic definition of disability than activity limitation or functional limitation; it is also of somewhat dubious validity for people without work histories, and for those elderly people who retired from work long ago.

Because of the longitudinal nature of the CPS, it is possible to link data from the two above-mentioned supplemental surveys. Of the eight panels interviewed in December 1998, two were re-interviewed the following March.[2] Thus, for one-quarter of the sample, minus missing responses, it is possible to obtain the work disability status of those persons whose computer and Internet usage was separately measured.

The two panels for which both surveys were administered number 30,128 records, out of a total of 122,935 records for the entire Computer/Internet supplement. In 91.6 percent of these cases it is possible to merge data from the two supplements; the remaining 8.4 percent (2522 records) have been dropped for lack of work disability data. Simple non-response is one reason for missing data. Another is that the CPS is a survey of households rather than of families, and no attempt is made to recontact families who moved between interviews. The new residents of the household are interviewed instead, which leaves us with no information on the disability status of the persons of interest.

The merged sample used in this analysis numbers 27,606 records, or 22.5 percent of the full Computer/Internet Supplement sample. Some 2,196 records represent persons identified as having work disabilities. The reduced sample lacks the statistical power for a highly detailed analysis of the computer and Internet use habits of people with disabilities, but it is adequate to provide comparisons of computer ownership and Internet use among broad sub-populations with and without work disabilities.

For the purposes of evaluating computer and

[1] It would be possible, however, to use the monthly survey to analyze the population unable to work because of health, but this is an overly restrictive definition of disability.

[2] It is fortuitous that the survey was conducted in December, so that there was a partial overlap with the March demographic supplement. The previous supplement on computer and Internet use, conducted in October 1997, had no panels that overlapped with March 1997 or 1998.

Internet use among various racial and ethnic groups, this report imitates the NTIA study in using the household as the unit of analysis. The household's racial and ethnic classification is that of the first respondent listed in the survey roster—generally the person in whose name the home is owned or rented. Unlike the NTIA analysis, however, this report preserves the survey's distinction between the racial classification and the identification of Hispanic origin. In other words, a householder identifying herself as black (in response to the question about race) and of Hispanic origin (in response to a separate question on ethnicity) would have her household listed under the racial category African American as well as the ethnic category Hispanic.

For some 21.8 percent of *households*, or 10,480 of the 48,070 households interviewed in the Computer and Internet Supplement, the Demographic Supplement contains records for all household members. Only these households, for which complete work disability information is available, have been retained in this analysis.

Survey non-response has been observed to vary with age, sex, and racial background. The probability of a family changing residence during the three-month lag between interviews is also likely to vary with these characteristics. In order to reduce biases due to missing data (as well as to account for the missing panels), individual records in the merged sample have been re-weighted so as to obtain the same population estimate as the full sample in 60 age-sex-race cells (15 age bins, 2 sexes, and 2 races—black vs. other).

In the analysis of households, the re-weighting (based on the original household weight) uses the age, sex, and race of the first respondent listed in the survey roster. For this analysis, 40 age-sex-race cells are used for post-stratification, with the number of age bins reduced to 10 so that the few households headed by persons under 20 years of age are all relegated to a single age bin.

Because the estimates in this report are based on a sample of the population, they are subject to sampling error. Estimates of sampling errors have been calculated using formulas provided by the Bureau of the Census (Bureau of the Census, 1999).[3] In the data tables, estimates with low statistical reliability (standard error greater than 30 percent of the estimate) are flagged with an asterisk. All comparisons mentioned in the text have been tested for statistical significance, and, unless otherwise stated, are significant at the 95 percent confidence level or greater ($p<.05$).

[3] The stratum and primary sampling unit data necessary for direct estimation of standard errors are not provided in the CPS public use data files.

ANALYSIS RESULTS

Of the 20.9 million Americans aged 15 and over with work disabilities (see above for definition), 5.0 million have computers at home (Table A). Less than half of this group, 2.4 million people, have access to the Internet via their home computer, whether or not they choose to take advantage of it. Some 1.5 million actually use the Internet at home; 2.1 million people with disabilities make use of the Internet either at home or on some other computer.

As shown in Figure 1, people with disabilities are less than half as likely as their non-disabled counterparts to have access to a computer at home (23.9 vs. 51.7 percent). The gap in Internet access is even more striking: Almost three times as many people without disabilities have the ability to connect to the Internet at home as those with disabilities—31.1 versus 11.4 percent.

Whether through a home computer or one at work, at school, or in a library, people with disabilities are far less likely than those without disabilities to make use of the Internet. Only one-tenth (9.9 percent) of people with disabilities connect to the Internet, compared to almost four-tenths (38.1 percent) of those without disabilities. When they do use the Internet, it is likely to be done at home (7.2 percent use the Internet at home, compared to 25.9 percent of those without disabilities). Internet use away from home is much less common for those with disabilities, in part because most people with work disabilities are not employed: Only 3.9 percent of those with disabilities use the Internet outside of the home, compared to 20.6 percent of their non-disabled counterparts.

Age and Gender

Although the disability population is heavily skewed toward the older ages, and older people

Table A. Computer ownership and Internet use, by disability status and age group, ages 15 and over.

	Work disability			No disability	
	Number (1000s)	%		Number (1000s)	%
Persons aged 15 and above	20,877	100.0		189,954	100.0
Has computer in household	4,983	23.9	†	98,267	51.7
Has Internet access at home	2,379	11.4	†	59,132	31.1
Uses Internet	2,076	9.9	†	72,300	38.1
at home	1,512	7.2	†	49,126	25.9
elsewhere	821	3.9	†	39,050	20.6
Persons aged 15–64	12,579	100.0		164,928	100.0
Has computer	4,106	32.6	†	91,618	55.6
Has Internet access at home	1,991	15.8	†	55,903	33.9
Uses Internet	1,896	15.1	†	69,702	42.3
Persons aged 65 and above	8,289	100.0		23,973	100.0
Has computer	877	10.6	†	6,056	25.3
Has Internet access at home	388	4.7	†	2,944	12.3
Uses Internet	180	2.2	*†	2,134	8.9

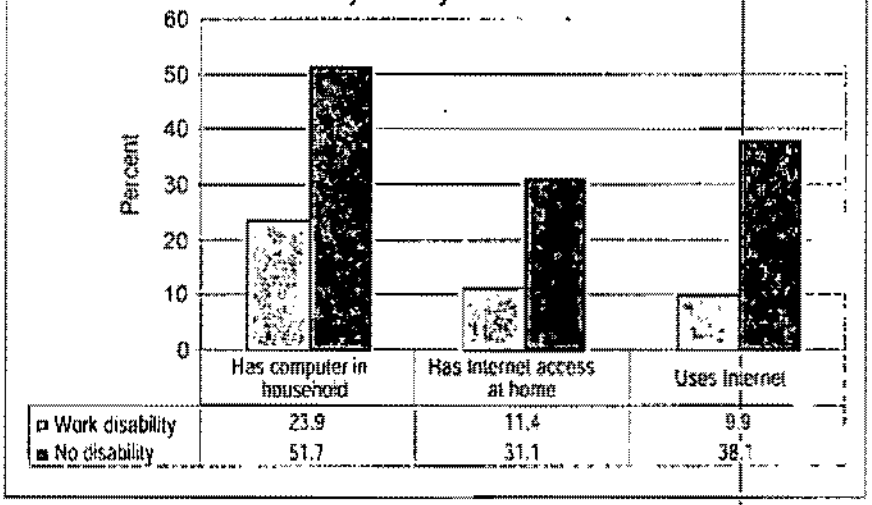
Source: Current Population Survey, 1998 Computer and Internet Use Supplement and 1999 Annual Demographic Supplement

†Difference in rates between populations with and without work disability is statistically significant at the 95% confidence level or better.

*Estimate has low statistical reliability (standard error exceeds 30 percent of estimate).

are less likely to use new technologies, the above-mentioned gaps are not accounted for by differences in age. As Figure 2 shows, significant differences remain in rates of computer ownership, Internet access, and Internet use for both the non-elderly (ages 15–64) and elderly (65 and above) populations.

Figure 1. Computer ownership and Internet use, by disability status.



Only one-third (32.6 percent) of non-elderly persons with work disabilities have computers in their homes, compared to more than half (55.6 percent) of those without disabilities. Once again, only about half of those computer-owners with disabilities can access the Internet—15.8 percent of the disability population, compared to 33.9 percent of the non-disabled. And the ratio of Internet use is nearly 3 to 1: 42.3 percent of people without disabilities use the Internet, compared to only 15.1 percent of those with disabilities.

Among the elderly, only one-quarter (25.3 percent) of those without disabilities have computers, but a still smaller fraction—only one-tenth, or 10.6 percent—of those with disabilities have them. Internet access is available for about half of computer owners in each group (12.3 percent of non-disabled and 4.7 percent of those with disabilities). Although actual use of the Internet is rare among the elderly, it is far higher for those without disabilities (8.9 percent) than for those with (2.2 percent).

For the population as a whole, the gender gap in computer ownership and Internet use is statistically significant but surprisingly small. Just over half (51.6 percent) of men and just under half (48.7 percent) of women have access to a computer at home; one-third (33.3 percent) of men and just under a third (30.5 percent) of women use the Internet. Among the population with work disabilities, there are no statistically significant gender gaps (Table B). The gaps between those with

Figure 2. Computer ownership and Internet use, by age group and disability status.

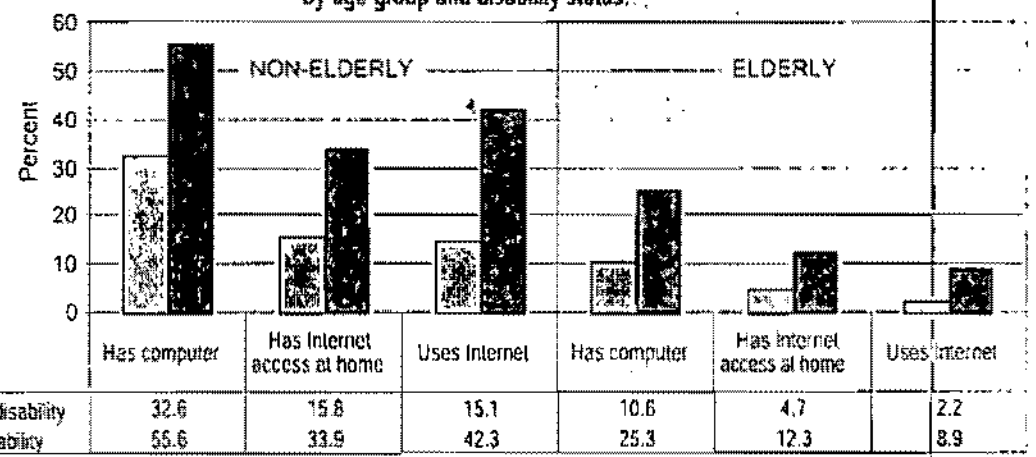


Figure 3. Computer and Internet use, by disability and employment status, ages 18–64.

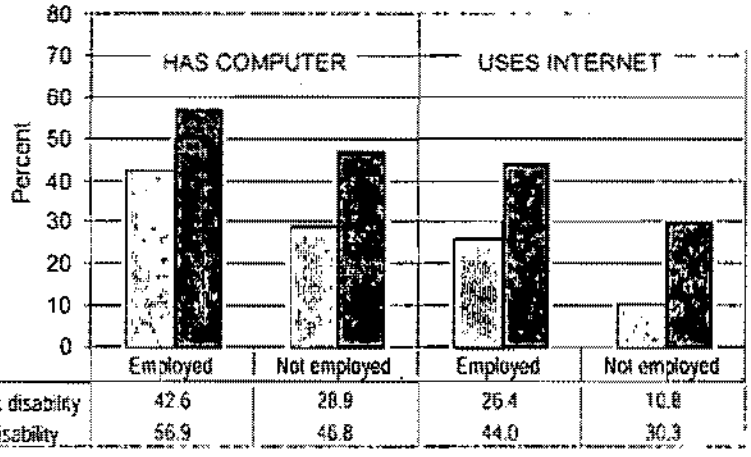


Table B. Computer ownership and Internet use, by disability status, gender, employment status, educational attainment, and family income, ages 15 and over.

	With work disability					No work disability				
	Total population	Computer in household		Uses Internet		Total population	Computer in household		Uses Internet	
	Number (1000s)	Number (1000s)	%	Number (1000s)	%	Number (1000s)	Number (1000s)	%	Number (1000s)	%
Gender										
Male	9,587	2,383	24.9 †	1,056	11.0 †	92,105	49,040	53.2	36,942	40.1
Female	11,289	2,600	23.0 †	1,020	9.0 †	97,849	49,227	50.3	35,358	36.1
Employment status (ages 18–64 only)										
Employed	3,351	1,427	42.6 †	885	26.4 †	124,001	70,547	56.9	54,621	44.0
Not employed	9,024	2,608	28.9 †	970	10.8 †	29,445	13,786	46.8	8,914	30.3
Educational attainment										
Not high school grad	7,461	949	12.7 †	179 *	2.4 * †	37,520	12,949	34.5	8,457	22.5
High school grad	11,418	3,105	27.2 †	1,294	11.3 †	106,779	53,267	49.0	35,957	33.1
College grad	1,998	929	46.5 †	604	30.2 †	43,655	32,051	73.4	27,885	63.9
Family income										
Less than $20,000	8,614	950	11.0 †	424	4.9 †	28,557	6,326	22.2	5,419	19.0
$20,000 or more	8,512	3,403	40.0 †	1,417	16.6 †	132,451	81,042	61.2	59,916	45.2

Source: Current Population Survey, 1998 Computer and Internet Use Supplement and 1999 Annual Demographic Supplement.

†Difference in rates between households with and without work disability is statistically significant at the 95% confidence level or better.

*Estimate has low statistical reliability (standard error exceeds 30 percent of estimate).

and without disabilities remain large and significant for both sexes, however. For example, 24.9 percent of men with disabilities own computers, compared to 53.2 percent without; 23.0 percent of women with disabilities own computers, versus 50.3 percent without.

Employment Status

For working-age adults, having a job can make it financially feasible to buy a computer; often, on-the-job access to computers and the Internet is also provided, along with training in how to use them. It is not surprising, therefore, that people with and without work disabilities are more likely to have computers and use the Internet if they are employed than if they are not (Figure 3 and Table B).

But even when they do have jobs, people with disabilities are significantly less likely to gain access to these new technologies: Among employed people with work disabilities, 42.6 percent have computers and 26.4 percent use the Internet, compared to 56.9 and 44.0 percent of their non-disabled counterparts. All around, rates are significantly lower among those without jobs: Only three-tenths (28.9 percent) of those with disabilities have computers, and only about one-tenth (10.8 percent) use the Internet.

Educational Attainment

People who are well educated are far more likely to have the skills, not to mention the financial resources, necessary to buy and use computer technology. But regardless of the level of educational attainment, people with disabilities have much lower rates of computer ownership and Internet use than their non-disabled peers (Figure 4).

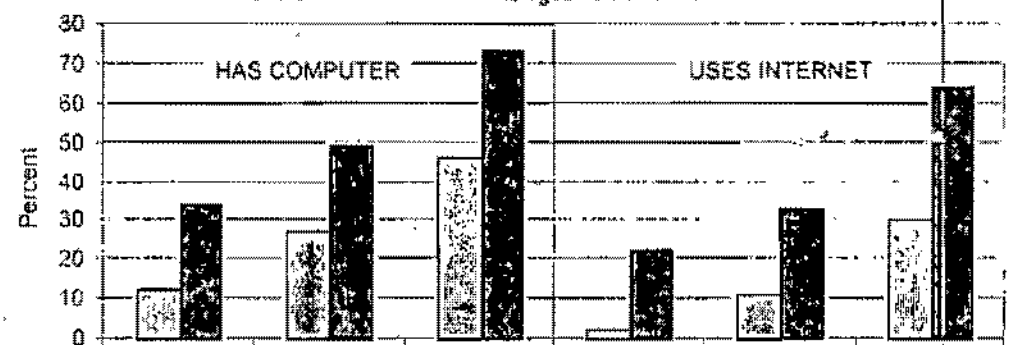
Only one-eighth (12.7 percent) of people with disabilities who have not graduated from high school own computers. This figure compares with one-third (34.5 percent) of non-high-school-graduates without disabilities, almost half (46.5 percent) of college graduates *with* disabilities, and three-quarters (73.4 percent) of college graduates without disabilities.

Even more striking is the fact that only 2.4 percent of people with disabilities who lack high school diplomas use the Internet. Those without disabilities are almost 10 times as likely to connect (22.5 percent), and those with disabilities who have college degrees are still more likely (30.2 percent). But even this last group has less than half the likelihood of Internet use as college graduates without disabilities, almost two-thirds (63.9 percent) of whom are Internet users.

Family Income

Half (50.3 percent) of people with work disabilities have family incomes of under $20,000 per year. For this group, buying a computer and paying the monthly fees of an Internet service provider may seem like a frivolous expense in relation to the basic necessities of life. Low-income

Figure 4. Computer and Internet use, by disability status and educational attainment, ages 15 and over.



	Not high school grad	High school grad	College grad	Not high school grad	High school grad	College grad
Work disability	12.7	27.2	46.5	2.4	11.3	30.2
No disability	34.5	49.0	73.4	22.5	33.1	63.9

Figure 5. Computer and Internet use, by disability status and family income, ages 15 and over.

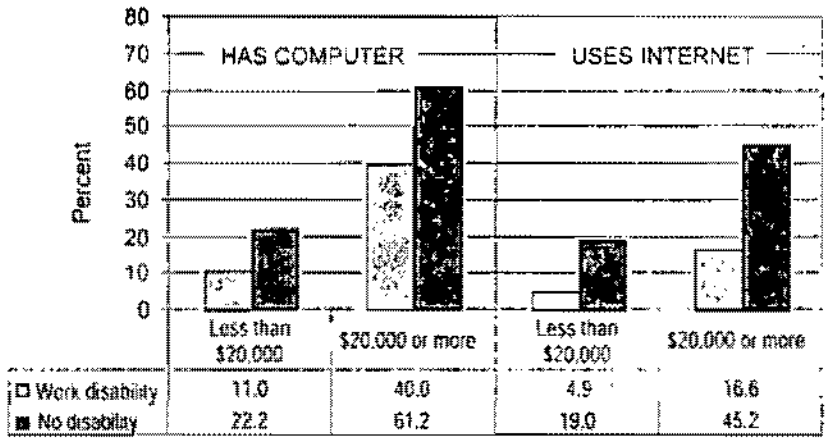


Table C. Household computer and Internet access, by race, ethnicity, and disability status of household members.

	With work disability					No work disability				
	Total households	Computer in household		Household has Internet access		Total households	Computer in household		Household has Internet access	
	Number (1000s)	Number (1000s)	%	Number (1000s)	%	Number (1000s)	Number (1000s)	%	Number (1000s)	%
All households	17,709	4,298	24.3 †	2,144	12.1 †	86,503	41,179	47.6	24,772	28.6
Race										
White	14,297	3,833	26.8 †	1,905	13.3 †	73,133	36,693	50.2 ¥	22,454	30.7
African American	2,910	311	10.7 † ¥	141	4.8 † ¥	9,879	2,602	26.3 † ¥	1,130	11.4 † ¥
Native American	208	43 *	20.7 *	41 *	19.5 *	583	228	39.1	143	24.6
Asian/Pacific Isl.	294	111	37.8 †	58 *	19.7 * †	2,909	1,656	56.9 † ¥	1,045	35.9
Ethnicity										
Hispanic	1,257	239	19.0 †	106 *	8.5 *	6,996	2,282	32.7 † ¥	1,018	14.6 † ¥
Non-Hispanic	16,452	4,059	24.7 †	2,038	12.4 †	79,517	38,897	48.9 ¥	23,755	29.9

Source: Current Population Survey, 1998 Computer and Internet Use Supplement and 1999 Annual Demographic Supplement

Note: A household is classified as having a work disability if any member has a work disability. Race and ethnicity are those of the first person listed in the survey roster, generally the person in whose name the home is owned or rented. Households of Hispanic ethnicity are also included in the appropriate racial categories.

† Difference in rates between households with and without work disability is statistically significant at the 95% confidence level or better.

¥ Rate is significantly different from that of whites (for racial groups) or non-Hispanics (for Hispanics) at the 95% confidence level or better.

* Estimate has low statistical reliability (standard error exceeds 30 percent of estimate).

people with and without disabilities own computers and use the Internet at rates much lower than those of their more financially comfortable counterparts (Figure 5).

In both income categories, people with disabilities are significantly less likely to own computers: half as likely for the low-income group (11.0 percent vs. 22.2 percent), and two-thirds as likely for the higher-income group (40.0 vs. 61.2 percent). Use of the Internet is one-quarter as likely among the low-income group (4.9 percent for those with disabilities vs. 19.0 percent for those without) and just over one-third as likely for the higher-income group (16.6 percent vs. 45.2 percent).

Race and Ethnicity

Table C and Figure 6 present statistics on *household* computer ownership and Internet access, broken down into racial and ethnic categories (see Data Source and Methods for details on racial and ethnic classification). Households are classified as having work disabilities if one or more members of the household have a work disability.

Within each racial and ethnic group, the rate of computer ownership is much lower when there is a disability present in the household than when there is not.[4] Among white households, those with disabilities are about half as likely to own computers as are those without (26.8 vs. 50.2 percent). Among African American households, only one-tenth (10.7 percent) of those with disabilities have computers, compared to one-quarter (26.3 percent) of households having no members with disabilities. Some 37.8 percent of Asian and Pacific Islander households with disabilities have computers, compared to 56.9 percent of those without disabilities. And among Hispanic households, 19.0 percent of those with disabilities have computers, versus 32.7 percent of those with no disability.

There are also large gaps in Internet access within the racial categories.[5] Across the board, households having members with work disabilities are roughly half as likely to be connected to the Internet as those without disabled members (for white households, 13.3 vs. 30.7 percent; for black households, 4.8 vs. 11.4 percent; for Asian/Pacific Islander households, 19.7 vs. 35.9 percent).

Among those households having members with work disabilities, most of the differences in rates between racial and ethnic groups are not statistically significant. But one set of differences is significant, and it bears pointing out: Among households with work disabilities, : African

[4] For Native Americans, the gaps in computer ownership and Internet access are not statistically significant and have not been shown in Figure 6.

[5] Among people of Hispanic origin, the difference in Internet access rates is not statistically significant.

Figure 6. Household computer ownership and Internet access, by race/ethnicity and disability status of household members.

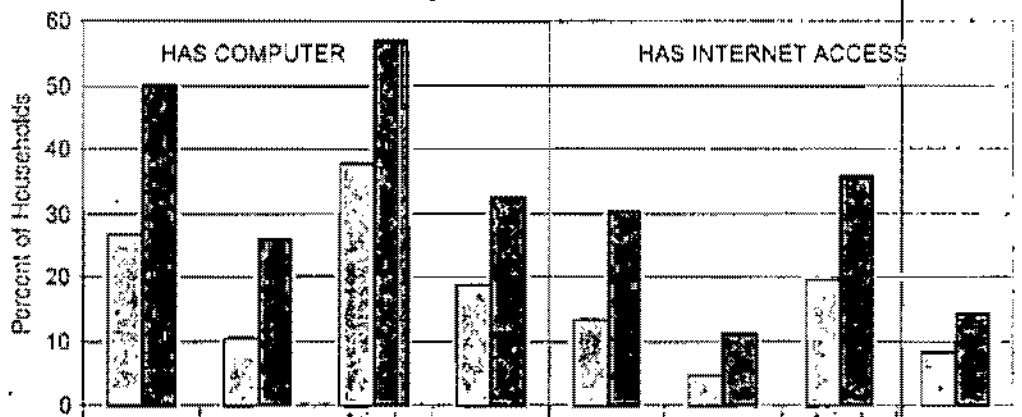


Table D. Reasons for using the Internet, by disability status, ages 15 and over.

	Work disability		No disability	
	Number (1000s)	%	Number (1000s)	%
All Internet users	2,076	100.0	72,300	100.0
Electronic mail	1,393	67.1	54,335	75.2
Search for info.	1,304	62.8	46,466	64.3
News, weather, sports	810	39.0	32,529	45.0
Courses, schoolwork	608	29.3	25,456	35.2
Job-related tasks	543	26.2	31,182	43.1
Shop, pay bills, etc.	353	17.0	16,295	22.5
Search for jobs	330	15.9	12,066	16.7
Other	498	24.0	13,075	18.1

Source: Current Population Survey, 1998 Computer and Internet Use Supplement and 1999 Annual Demographic Supplement

American households are much less likely than white households to have a computer (10.7 vs. 26.8 percent) or have access to the Internet (4.8 vs. 13.3 percent).

It is also worth noting that the rates for white households *with* disabilities (26.8 percent of which have computers and 13.3 percent of which have access to the Internet) are roughly equal to those of African American households *without* disabilities (26.3 and 11.4 percent, respectively). Thus, in comparing these populations, disability and race can be seen to be equally significant factors in determining the household's likelihood of exposure to computer technology.

Reasons for Internet Use

By far the most common reasons that people with disabilities cite for using the Internet are sending and receiving electronic mail (1.4 million people, or 67.1 percent of the 2.1 million Internet users) and searching for information (1.3 million, or 62.8 percent; see Table D). These are also the two top-ranked reasons for Internet use among people without disabilities.

Four-tenths (39.0 percent) of Internet users with disabilities read the news online, check the weather forecast, or obtain sports scores. Three-tenths (29.3 percent) take courses over the Internet or use online resources to help with schoolwork. One-quarter (26.2 percent) of Internet users with disabilities use the Internet for job-related tasks, a significantly lower figure than the 43.1 percent of Internet users without disabilities, who are more likely to have jobs. One-sixth (17.0 percent) use the Internet for shopping, paying bills, or other commercial activities, and 15.9 percent use it to look for employment opportunities.

CONCLUSIONS

People with disabilities are perhaps the single segment of society with the most to gain from the new technologies of the electronic age. Yet they have among the lowest rates of use of these technologies. As a result, the potential benefits of computers and the Internet to the disability community are a long way from being realized.

The problem is largely one of access. Many people with disabilities are poor and can little afford a computer capable of navigating the Internet, the specialized software they might need in order to adapt it to their needs, and the monthly charges imposed for access to the Internet. Many people with disabilities, whether elderly or not, lack an awareness of the potential benefits of this technology, an understanding that, for themselves especially, a computer and an Internet connection could become not a toy, but an important tool with which to gain greater independence and social integration.

The advent of lower-cost computing—including the free computers that come with an extended subscription to an Internet service provider—may help to make this technology more available. Simpler user interfaces, which would encourage use by people who are less comfortable with the technology, might also help people with disabilities to overcome any resistance they might have to exploring the Internet. But it seems clear that, in order to clarify the benefits that this technology can offer to the population with disabilities, a concerted program of education will be needed, along with training and support in the use of the hardware and software, before significant progress is made in closing the enormous gaps in technology access that have been identified in this report.

REFERENCES

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[contents] [checklist]

Web Content Accessibility Guidelines 1.0

W3C Recommendation 5-May-1999

This version:
http://www.w3.org/TR/1999/WAI-WEBCONTENT-19990505
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Abstract

These guidelines explain how to make *Web content* accessible to people with disabilities. The guidelines are intended for all *Web content developers* (page authors and site designers) and for developers of *authoring tools*. The primary goal of these guidelines is to promote accessibility. However, following them will also make Web content more available to *all* users, whatever *user agent* they are using (e.g., desktop browser, voice browser, mobile phone, automobile-based personal computer, etc.) or constraints they may be operating under (e.g., noisy surroundings, under- or over-illuminated rooms, in a hands-free environment, etc.). Following these guidelines will also help people find information on the Web more quickly. These guidelines do not discourage content developers from using images, video, etc., but rather explain how to make multimedia content more accessible to a wide audience.

This is a reference document for accessibility principles and design ideas. Some of the strategies discussed in this document address certain Web internationalization and mobile access concerns. However, this document focuses on accessibility and does not fully address the related concerns of other W3C Activities. Please consult the W3C Mobile Access Activity home page and the

W3C Internationalization Activity home page for more information.

This document is meant to be stable and therefore does not provide specific information about browser support for different technologies as that information changes rapidly. Instead, the Web Accessibility Initiative (WAI) Web site provides such information (refer to [WAI-UA-SUPPORT]).

This document includes an appendix that organizes all of the *checkpoints* by topic and priority. The checkpoints in the appendix link to their definitions in the current document. The topics identified in the appendix include images, multimedia, tables, frames, forms, and scripts. The appendix is available as either a tabular summary of checkpoints or as a simple list of checkpoints.

A separate document, entitled "Techniques for Web Content Accessibility Guidelines 1.0" ([TECHNIQUES]), explains how to implement the checkpoints defined in the current document. The Techniques Document discusses each checkpoint in more detail and provides examples using the Hypertext Markup Language (HTML), Cascading Style Sheets (CSS), Synchronized Multimedia Integration Language (SMIL), and the Mathematical Markup Language (MathML). The Techniques Document also includes techniques for document validation and testing, and an index of HTML elements and attributes (and which techniques use them). The Techniques Document has been designed to track changes in technology and is expected to be updated more frequently than the current document. **Note.** Not all browsers or multimedia tools may support the features described in the guidelines. In particular, new features of HTML 4.0 or CSS 1 or CSS 2 may not be supported.

"Web Content Accessibility Guidelines 1.0" is part of a series of accessibility guidelines published by the Web Accessibility Initiative. The series also includes User Agent Accessibility Guidelines ([WAI-USERAGENT]) and Authoring Tool Accessibility Guidelines ([WAI-AUTOOLS]).

Status of this document

This document has been reviewed by W3C Members and other interested parties and has been endorsed by the Director as a W3C Recommendation. It is a stable document and may be used as reference material or cited as a normative reference from another documents. W3C's role in making the Recommendation is to draw attention to the specification and to promote its widespread deployment. This enhances the functionality and universality of the Web.

The English version of this specification is the only normative version. However, for translations in other languages see http://www.w3.org/WAI/GL/WAI-WEBCONTENT-TRANSLATIONS.

The list of known errors in this document is available at http://www.w3.org/WAI/GL/WAI-WEBCONTENT-ERRATA. Please report errors in this document to wai-wcag-editor@w3.org.

A list of current W3C Recommendations and other technical documents can be found at http://www.w3.org/TR.

This document has been produced as part of the W3C Web Accessibility Initiative. The goal of the Web Content Guidelines Working Group is discussed in the Working Group charter.

Table of Contents

The appendix list of checkpoints is available as either a tabular summary of checkpoints or as a simple list of checkpoints.

1. Introduction

For those unfamiliar with accessibility issues pertaining to Web page design, consider that many users may be operating in contexts very different from your own:

- They may not be able to see, hear, move, or may not be able to process some types of information easily or at all.
- They may have difficulty reading or comprehending text.
- They may not have or be able to use a keyboard or mouse.
- They may have a text-only screen, a small screen, or a slow Internet connection.
- They may not speak or understand fluently the language in which the document is written.
- They may be in a situation where their eyes, ears, or hands are busy or interfered with (e.g., driving to work, working in a loud environment, etc.).
- They may have an early version of a browser, a different browser entirely, a voice browser, or a different operating system.

Content developers must consider these different situations during page design. While there are several situations to consider, each accessible design choice generally benefits several disability groups at once and the Web community as a whole. For example, by using *style sheets* to control font styles and eliminating the FONT element, HTML authors will have more control over their pages, make those pages more accessible to people with low vision, and by sharing the style sheets, will often shorten page download times for all users.

The guidelines discuss accessibility issues and provide accessible design solutions. They address typical scenarios (similar to the font style example) that may pose problems for users with certain disabilities. For example, the first guideline explains how content developers can make images accessible. Some users may not be able to see images, others may use text-based browsers that do not support images, while others may have turned off support for images (e.g., due to a slow Internet connection). The guidelines do not suggest avoiding images as a way to improve accessibility. Instead, they explain that providing a *text equivalent* of the image will make it accessible.

How does a text equivalent make the image accessible? Both words in "text equivalent" are important:

- Text content can be presented to the user as synthesized speech, braille, and visually-displayed text. Each of these three mechanisms uses a different sense -- ears for synthesized speech, tactile for braille, and eyes for visually-displayed text -- making the information accessible to groups representing a variety of sensory and other disabilities.
- In order to be useful, the text must convey the same function or purpose as the image. For example, consider a text equivalent for a photographic image of the Earth as seen from outer space. If the purpose of the image is mostly that of decoration, then the text "Photograph of the Earth as seen from outer space" might fulfill the necessary function. If the purpose of the photograph is to illustrate specific information about world geography, then the text equivalent should convey that information. If the photograph has been designed to tell the user to select the image (e.g., by clicking on it) for information about the earth, equivalent text would be "Information about the Earth". Thus, if the text conveys the same function or purpose for the user

with a disability as the image does for other users, then it can be considered a text equivalent.

Note that, in addition to benefitting users with disabilities, text equivalents can help all users find pages more quickly, since search robots can use the text when indexing the pages.

While Web content developers must provide text equivalents for images and other multimedia content, it is the responsibility of *user agents* (e.g., browsers and assistive technologies such as *screen readers*, *braille displays*, etc.) to present the information to the user.

Non-text equivalents of text (e.g., icons, pre-recorded speech, or a video of a person translating the text into sign language) can make documents accessible to people who may have difficulty accessing written text, including many individuals with cognitive disabilities, learning disabilities, and deafness. Non-text equivalents of text can also be helpful to non-readers. An *auditory description* is an example of a non-text equivalent of visual information. An auditory description of a multimedia presentation's visual track benefits people who cannot see the visual information.

2. Themes of Accessible Design

The guidelines address two general themes: ensuring graceful transformation, and making content understandable and navigable.

2.1 Ensuring Graceful Transformation

By following these guidelines, content developers can create pages that transform gracefully. Pages that transform gracefully remain accessible despite any of the constraints described in the introduction, including physical, sensory, and cognitive disabilities, work constraints, and technological barriers. Here are some keys to designing pages that transform gracefully:

- Separate structure from presentation (refer to the difference between *content, structure, and presentation*).
- Provide text (including *text equivalents*). Text can be rendered in ways that are available to almost all browsing devices and accessible to almost all users.
- Create documents that work even if the user cannot see and/or hear. Provide information that serves the same purpose or function as audio or video in ways suited to alternate sensory channels as well. This does not mean creating a prerecorded audio version of an entire site to make it accessible to users who are blind. Users who are blind can use *screen reader* technology to render all text information in a page.
- Create documents that do not rely on one type of hardware. Pages should be usable by people without mice, with small screens, low resolution screens, black and white screens, no screens, with only voice or text output, etc.

The theme of graceful transformation is addressed primarily by guidelines 1 to 11.

2.2 Making Content Understandable and Navigable

Content developers should make content understandable and navigable. This includes not only making the language clear and simple, but also providing understandable mechanisms for navigating within and between pages. Providing navigation tools and orientation information in pages will maximize accessibility and usability. Not all users can make use of visual clues such as image maps, proportional scroll bars, side-by-side frames, or graphics that guide sighted users of graphical desktop browsers. Users also lose contextual information when they can only view a portion of a page, either because they are accessing the page one word at a time (speech synthesis or *braille display*), or one section at a time (small display, or a magnified display). Without orientation information, users may not be able to understand very large tables, lists, menus, etc.

The theme of making content understandable and navigable is addressed primarily in guidelines 12 to 14.

3. How the Guidelines are Organized

This document includes fourteen guidelines, or general principles of accessible design. Each guideline includes:

- The guideline number.
- The statement of the guideline.
- Guideline navigation links. Three links allow navigation to the next guideline (right arrow icon), the previous guideline (left arrow icon), or the current guideline's position in the table of contents (up arrow icon).
- The rationale behind the guideline and some groups of users who benefit from it.
- A list of checkpoint definitions.

The checkpoint definitions in each guideline explain how the guideline applies in typical content development scenarios. Each checkpoint definition includes:

- The checkpoint number.
- The statement of the checkpoint.
- The priority of the checkpoint. Priority 1 checkpoints are highlighted through the use of style sheets.
- Optional informative notes, clarifying examples, and cross references to related guidelines or checkpoints.
- A link to a section of the Techniques Document ([TECHNIQUES]) where implementations and examples of the checkpoint are discussed.

Each checkpoint is intended to be specific enough so that someone reviewing a page or site may verify that the checkpoint has been satisfied.

3.1 Document conventions

The following editorial conventions are used throughout this document:

- Element names are in uppercase letters.
- Attribute names are quoted in lowercase letters.
- Links to definitions are highlighted through the use of style sheets.

4. Priorities

Each checkpoint has a priority level assigned by the Working Group based on the checkpoint's impact on accessibility.

[Priority 1]
A Web content developer **must** satisfy this checkpoint. Otherwise, one or more groups will find it impossible to access information in the document. Satisfying this checkpoint is a basic requirement for some groups to be able to use Web documents.

[Priority 2]
A Web content developer **should** satisfy this checkpoint. Otherwise, one or more groups will find it difficult to access information in the document. Satisfying this checkpoint will remove significant barriers to accessing Web documents.

[Priority 3]
A Web content developer **may** address this checkpoint. Otherwise, one or more groups will find it somewhat difficult to access information in the document. Satisfying this checkpoint will improve access to Web documents.

Some checkpoints specify a priority level that may change under certain (indicated) conditions.

5. Conformance

This section defines three levels of conformance to this document:

- **Conformance Level "A"**: all Priority 1 checkpoints are satisfied;
- **Conformance Level "Double-A"**: all Priority 1 and 2 checkpoints are satisfied;
- **Conformance Level "Triple-A"**: all Priority 1, 2, and 3 checkpoints are satisfied;

Note. Conformance levels are spelled out in text so they may be understood when rendered to speech.

Claims of conformance to this document must use one of the following two forms.

Form 1: Specify:

- The guidelines title: "Web Content Accessibility Guidelines 1.0"
- The guidelines URI: http://www.w3.org/TR/1999/WAI-WEBCONTENT-19990505
- The conformance level satisfied: "A", "Double-A", or "Triple-A".
- The scope covered by the claim (e.g., page, site, or defined portion of a site.).

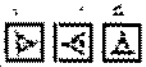
Example of Form 1:

> This page conforms to W3C's "Web Content Accessibility Guidelines 1.0", available at http://www.w3.org/TR/1999/WAI-WEBCONTENT-19990505, level Double-A.

Form 2: Include, on each page claiming conformance, one of three icons provided by W3C and link the icon to the appropriate W3C explanation of the claim. Information about the icons and how to insert them in pages is available at [WCAG-ICONS].

6. Web Content Accessibility Guidelines

Guideline 1. Provide equivalent alternatives to auditory and visual content.



Provide content that, when presented to the user, conveys essentially the same function or purpose as auditory or visual content.

Although some people cannot use images, movies, sounds, applets, etc. directly, they may still use pages that include *equivalent* information to the visual or auditory content. The equivalent information must serve the same purpose as the visual or auditory content. Thus, a text equivalent for an image of an upward arrow that links to a table of contents could be "Go to table of contents". In some cases, an equivalent should also describe the appearance of visual content (e.g., for complex charts, billboards, or diagrams) or the sound of auditory content (e.g., for audio samples used in education).

This guideline emphasizes the importance of providing *text equivalents* of non-text content (images, pre-recorded audio, video). The power of text equivalents lies in their capacity to be rendered in ways that are accessible to people from various disability groups using a variety of technologies. Text can be readily output to speech synthesizers and *braille displays*, and can be presented visually (in a variety of sizes) on computer displays and paper. Synthesized speech is critical for individuals who are blind and for many people with the reading difficulties that often accompany cognitive disabilities, learning disabilities, and deafness. Braille is essential for individuals who are both deaf and blind, as well as many individuals whose only sensory disability is blindness. Text displayed visually

benefits users who are deaf as well as the majority of Web users.

Providing non-text equivalents (e.g., pictures, videos, and pre-recorded audio) of text is also beneficial to some users, especially nonreaders or people who have difficulty reading. In movies or visual presentations, visual action such as body language or other visual cues may not be accompanied by enough audio information to convey the same information. Unless verbal descriptions of this visual information are provided, people who cannot see (or look at) the visual content will not be able to perceive it.

Checkpoints:

1.1 Provide a text equivalent for every non-text element (e.g., via "alt", "longdesc", or in element content). *This includes*: images, graphical representations of text (including symbols), image map regions, animations (e.g., animated GIFs), applets and programmatic objects, ascii art, frames, scripts, images used as list bullets, spacers, graphical buttons, sounds (played with or without user interaction), stand-alone audio files, audio tracks of video, and video. [Priority 1]

For example, in HTML:

- Use "alt" for the IMG, INPUT, and APPLET elements, or provide a text equivalent in the content of the OBJECT and APPLET elements.
- For complex content (e.g., a chart) where the "alt" text does not provide a complete text equivalent, provide an additional description using, for example, "longdesc" with IMG or FRAME, a link inside an OBJECT element, or a description link.
- For image maps, either use the "alt" attribute with AREA, or use the MAP element with A elements (and other text) as content.

Refer also to checkpoint 9.1 and checkpoint 13.10.

Techniques for checkpoint 1.1

1.2 Provide redundant text links for each active region of a server-side image map. [Priority 1]

Refer also to checkpoint 1.5 and checkpoint 9.1.

Techniques for checkpoint 1.2

1.3 Until user agents can automatically read aloud the text equivalent of a visual track, provide an auditory description of the important information of the visual track of a multimedia presentation. [Priority 1]

Synchronize the *auditory description* with the audio track as per checkpoint 1.4. Refer to checkpoint 1.1 for information about textual equivalents for visual information.

Techniques for checkpoint 1.3

1.4 For any time-based multimedia presentation (e.g., a movie or animation), synchronize equivalent alternatives (e.g., captions or auditory descriptions of the visual track) with the presentation. [Priority 1]

Techniques for checkpoint 1.4

1.5 Until user agents render text equivalents for client-side image map links, provide redundant text links for each active region of a client-side image map. [Priority 3]
Refer also to checkpoint 1.2 and checkpoint 9.1.
Techniques for checkpoint 1.5

Guideline 2. Don't rely on color alone.

Ensure that text and graphics are understandable when viewed without color.

If color alone is used to convey information, people who cannot differentiate between certain colors and users with devices that have non-color or non-visual displays will not receive the information. When foreground and background colors are too close to the same hue, they may not provide sufficient contrast when viewed using monochrome displays or by people with different types of color deficits.

Checkpoints:

2.1 Ensure that all information conveyed with color is also available without color, for example from context or markup. [Priority 1]
Techniques for checkpoint 2.1
2.2 Ensure that foreground and background color combinations provide sufficient contrast when viewed by someone having color deficits or when viewed on a black and white screen. [Priority 2 for images, Priority 3 for text].
Techniques for checkpoint 2.2

Guideline 3. Use markup and style sheets and do so properly.

Mark up documents with the proper structural elements. Control presentation with style sheets rather than with presentation elements and attributes.

Using markup improperly -- not according to specification -- hinders accessibility. Misusing markup for a presentation effect (e.g., using a table for layout or a header to change the font size) makes it difficult for users with specialized software to understand the organization of the page or to navigate through it. Furthermore, using presentation markup rather than structural markup to convey structure (e.g., constructing what looks like a table of data with an HTML PRE element) makes it difficult to render a page intelligibly to other devices (refer to the description of *difference between content, structure, and presentation*).

Content developers may be tempted to use (or misuse) constructs that achieve a desired formatting effect on older browsers. They must be aware that these practices cause accessibility problems and must consider whether the formatting effect is so critical as to warrant making the document inaccessible to some users.

At the other extreme, content developers must not sacrifice appropriate markup because a certain browser or assistive technology does not process it correctly. For example, it is appropriate to use the TABLE element in HTML to mark up *tabular information* even though some older screen readers may not handle side-by-side text correctly (refer to checkpoint 10.3). Using TABLE correctly and creating tables that transform gracefully (refer to guideline 5) makes it possible for software to render tables other than as two-dimensional grids.

Checkpoints:

3.1 When an appropriate markup language exists, use markup rather than images to convey information. [Priority 2]
For example, use MathML to mark up mathematical equations, and *style sheets* to format text and control layout. Also, avoid using images to represent text -- use text and style sheets instead. Refer also to guideline 6 and guideline 11.
Techniques for checkpoint 3.1

3.2 Create documents that validate to published formal grammars. [Priority 2]
For example, include a document type declaration at the beginning of a document that refers to a published DTD (e.g., the strict HTML 4.0 DTD).
Techniques for checkpoint 3.2

3.3 Use style sheets to control layout and presentation. [Priority 2]
For example, use the CSS 'font' property instead of the HTML FONT element to control font styles.
Techniques for checkpoint 3.3

3.4 Use relative rather than absolute units in markup language attribute values and style sheet property values. [Priority 2]
For example, in CSS, use 'em' or percentage lengths rather than 'pt' or 'cm', which are absolute units. If absolute units are used, validate that the rendered content is usable (refer to the section on validation).
Techniques for checkpoint 3.4

3.5 Use header elements to convey document structure and use them according to specification. [Priority 2]
For example, in HTML, use H2 to indicate a subsection of H1. Do not use headers for font effects.
Techniques for checkpoint 3.5

3.6 Mark up lists and list items properly. [Priority 2]
For example, in HTML, nest OL, UL, and DL lists properly.
Techniques for checkpoint 3.6

3.7 Mark up quotations. Do not use quotation markup for formatting effects such as indentation. [Priority 2]

For example, in HTML, use the Q and BLOCKQUOTE elements to markup short and longer quotations, respectively.
Techniques for checkpoint 3.7

Guideline 4. Clarify natural language usage

Use markup that facilitates pronunciation or interpretation of abbreviated or foreign text.

When content developers mark up natural language changes in a document, speech synthesizers and braille devices can automatically switch to the new language, making the document more accessible to multilingual users. Content developers should identify the predominant *natural language* of a document's content (through markup or HTTP headers). Content developers should also provide expansions of abbreviations and acronyms.

In addition to helping assistive technologies, natural language markup allows search engines to find key words and identify documents in a desired language. Natural language markup also improves readability of the Web for all people, including those with learning disabilities, cognitive disabilities, or people who are deaf.

When abbreviations and natural language changes are not identified, they may be indecipherable when machine-spoken or brailled.

Checkpoints:

4.1 Clearly identify changes in the natural language of a document's text and any *text equivalents* (e.g., captions). [Priority 1]
For example, in HTML, use the "lang" attribute. In XML, use "xml:lang".
Techniques for checkpoint 4.1

4.2 Specify the expansion of each abbreviation or acronym in a document where it first occurs. [Priority 3]
For example, in HTML, use the "title" attribute of the ABBR and ACRONYM elements. Providing the expansion in the main body of the document also helps document usability.
Techniques for checkpoint 4.2

4.3 Identify the primary natural language of a document. [Priority 3]
For example, in HTML set the "lang" attribute on the HTML element. In XML, use "xml:lang". Server operators should configure servers to take advantage of HTTP content negotiation mechanisms ([RFC2068], section 14.13) so that clients can automatically retrieve documents of the preferred language.
Techniques for checkpoint 4.3

Guideline 5. Create tables that transform gracefully.

Ensure that tables have necessary markup to be transformed by accessible browsers and other user agents.

Tables should be used to mark up truly *tabular information* ("data tables"). Content developers should avoid using them to lay out pages ("layout tables"). Tables for any use also present special problems to users of *screen readers* (refer to checkpoint 10.3).

Some *user agents* allow users to navigate among table cells and access header and other table cell information. Unless marked-up properly, these tables will not provide user agents with the appropriate information. (Refer also to guideline 3.)

The following checkpoints will directly benefit people who access a table through auditory means (e.g., a screen reader or an automobile-based personal computer) or who view only a portion of the page at a time (e.g., users with blindness or low vision using speech output or a *braille display*, or other users of devices with small displays, etc.).

Checkpoints:

5.1 For data tables, identify row and column headers. [Priority 1]
For example, in HTML, use TD to identify data cells and TH to identify headers.
Techniques for checkpoint 5.1

5.2 For data tables that have two or more logical levels of row or column headers, use markup to associate data cells and header cells. [Priority 1]
For example, in HTML, use THEAD, TFOOT, and TBODY to group rows, COL and COLGROUP to group columns, and the "axis", "scope", and "headers" attributes, to describe more complex relationships among data.
Techniques for checkpoint 5.2

5.3 Do not use tables for layout unless the table makes sense when linearized. Otherwise, if the table does not make sense, provide an alternative equivalent (which may be a *linearized version*). [Priority 2]
Note. *Once user agents* support style sheet positioning, tables should not be used for layout. Refer also to checkpoint 3.3.
Techniques for checkpoint 5.3

5.4 If a table is used for layout, do not use any structural markup for the purpose of visual formatting. [Priority 2]
For example, in HTML do not use the TH element to cause the content of a (non-table header) cell to be displayed centered and in bold.
Techniques for checkpoint 5.4

5.5 Provide summaries for tables. [Priority 3]

For example, in HTML, use the "summary" attribute of the TABLE element.
Techniques for checkpoint 5.5

5.6 Provide abbreviations for header labels. [Priority 3]
For example, in HTML, use the "abbr" attribute on the TH element.
Techniques for checkpoint 5.6

Refer also to checkpoint 10.3.

Guideline 6. Ensure that pages featuring new technologies transform gracefully.

Ensure that pages are accessible even when newer technologies are not supported or are turned off.

Although content developers are encouraged to use new technologies that solve problems raised by existing technologies, they should know how to make their pages still work with older browsers and people who choose to turn off features.

Checkpoints:

6.1 Organize documents so they may be read without style sheets. For example, when an HTML document is rendered without associated style sheets, it must still be possible to read the document. [Priority 1]
When content is organized logically, it will be rendered in a meaningful order when style sheets are turned off or not supported.
Techniques for checkpoint 6.1

6.2 Ensure that equivalents for dynamic content are updated when the dynamic content changes. [Priority 1]
Techniques for checkpoint 6.2

6.3 Ensure that pages are usable when scripts, applets, or other programmatic objects are turned off or not supported. If this is not possible, provide equivalent information on an alternative accessible page. [Priority 1]
For example, ensure that links that trigger scripts work when scripts are turned off or not supported (e.g., do not use "javascript:" as the link target). If it is not possible to make the page usable without scripts, provide a text equivalent with the NOSCRIPT element, or use a server-side script instead of a client-side script, or provide an alternative accessible page as per checkpoint 11.4. Refer also to guideline 1.
Techniques for checkpoint 6.3

6.4 For scripts and applets, ensure that event handlers are input device-independent. [Priority 2]
Refer to the definition of device independence.
Techniques for checkpoint 6.4

6.5 Ensure that dynamic content is accessible or provide an alternative

presentation or page. [Priority 2]
For example, in HTML, use NOFRAMES at the end of each frameset. For some applications, server-side scripts may be more accessible than client-side scripts.
Techniques for checkpoint 6.5

Refer also to checkpoint 11.4.

Guideline 7. Ensure user control of time-sensitive content changes.

Ensure that moving, blinking, scrolling, or auto-updating objects or pages may be paused or stopped.

Some people with cognitive or visual disabilities are unable to read moving text quickly enough or at all. Movement can also cause such a distraction that the rest of the page becomes unreadable for people with cognitive disabilities. *Screen readers* are unable to read moving text. People with physical disabilities might not be able to move quickly or accurately enough to interact with moving objects.

Note. All of the following checkpoints involve some content developer responsibility *until user agents* provide adequate feature control mechanisms.

Checkpoints:

7.1 *Until user agents* allow users to control flickering, avoid causing the screen to flicker. [Priority 1]
Note. People with photosensitive epilepsy can have seizures triggered by flickering or flashing in the 4 to 59 flashes per second (Hertz) range with a peak sensitivity at 20 flashes per second as well as quick changes from dark to light (like strobe lights).
Techniques for checkpoint 7.1

7.2 *Until user agents* allow users to control blinking, avoid causing content to blink (i.e., change presentation at a regular rate, such as turning on and off). [Priority 2]
Techniques for checkpoint 7.2

7.3 *Until user agents* allow users to freeze moving content, avoid movement in pages. [Priority 2]
When a page includes moving content, provide a mechanism within a script or applet to allow users to freeze motion or updates. Using style sheets with scripting to create movement allows users to turn off or override the effect more easily. Refer also to guideline 8.
Techniques for checkpoint 7.3

7.4 *Until user agents* provide the ability to stop the refresh, do not create periodically auto-refreshing pages. [Priority 2]
For example, in HTML, don't cause pages to auto-refresh with "HTTP-EQUIV=refresh" until user agents allow users to turn off the feature.

Techniques for checkpoint 7.4

7.5 *Until user agents* provide the ability to stop auto-redirect, do not use markup to redirect pages automatically. Instead, configure the server to perform redirects. [Priority 2]

Techniques for checkpoint 7.5

Note. The BLINK and MARQUEE elements are not defined in any W3C HTML specification and should not be used. Refer also to guideline 11.

Guideline 8. Ensure direct accessibility of embedded user interfaces.

Ensure that the user interface follows principles of accessible design: device-independent access to functionality, keyboard operability, self-voicing, etc.

When an embedded object has its "own interface", the interface -- like the interface to the browser itself -- must be accessible. If the interface of the embedded object cannot be made accessible, an alternative accessible solution must be provided.

Note. For information about accessible interfaces, please consult the User Agent Accessibility Guidelines ([WAI-USERAGENT]) and the Authoring Tool Accessibility Guidelines ([WAI-AUTOOL]).

Checkpoint:

8.1 Make programmatic elements such as scripts and applets directly accessible or compatible with assistive technologies [Priority 1 if functionality is *important* and not presented elsewhere, otherwise Priority 2.]

Refer also to guideline 6.

Techniques for checkpoint 8.1

Guideline 9. Design for device-independence.

Use features that enable activation of page elements via a variety of input devices.

Device-independent access means that the user may interact with the user agent or document with a preferred input (or output) device -- mouse, keyboard, voice, head wand, or other. If, for example, a form control can only be activated with a mouse or other pointing device, someone who is using the page without sight, with

voice input, or with a keyboard or who is using some other non-pointing input device will not be able to use the form.

Note. Providing text equivalents for image maps or images used as links makes it possible for users to interact with them without a pointing device. Refer also to guideline 1.

Generally, pages that allow keyboard interaction are also accessible through speech input or a command line interface.

Checkpoints:

9.1 Provide client-side image maps instead of server-side image maps except where the regions cannot be defined with an available geometric shape. [Priority 1]
Refer also to checkpoint 1.1, checkpoint 1.2, and checkpoint 1.5.
Techniques for checkpoint 9.1

9.2 Ensure that any element that has its own interface can be operated in a device-independent manner. [Priority 2]
Refer to the definition of device independence.
Refer also to guideline 8.
Techniques for checkpoint 9.2

9.3 For scripts, specify logical event handlers rather than device-dependent event handlers. [Priority 2]
Techniques for checkpoint 9.3

9.4 Create a logical tab order through links, form controls, and objects. [Priority 3]
For example, in HTML, specify tab order via the "tabindex" attribute or ensure a logical page design.
Techniques for checkpoint 9.4

9.5 Provide keyboard shortcuts to important links (including those in *client-side image maps*), form controls, and groups of form controls. [Priority 3]
For example, in HTML, specify shortcuts via the "accesskey" attribute.
Techniques for checkpoint 9.5

Guideline 10. Use interim solutions.

Use interim accessibility solutions so that assistive technologies and older browsers will operate correctly.

For example, older browsers do not allow users to navigate to empty edit boxes. Older screen readers read lists of consecutive links as one link. These active elements are therefore difficult or impossible to access. Also, changing the current window or popping up new windows can be very disorienting to users who cannot see that this has happened.

Note. The following checkpoints apply *until user agents* (including *assistive technologies*) address these issues. These checkpoints are classified as "interim", meaning that the Web Content Guidelines Working Group considers them to be valid and necessary to Web accessibility *as of the publication of this document.* However, the Working Group does not expect these checkpoints to be necessary in the future, once Web technologies have incorporated anticipated features or capabilities.

Checkpoints:

10.1 *Until user agents* allow users to turn off spawned windows, do not cause pop-ups or other windows to appear and do not change the current window without informing the user. [Priority 2]
For example, in HTML, avoid using a frame whose target is a new window.
Techniques for checkpoint 10.1

10.2 *Until user agents* support explicit associations between labels and form controls, for all form controls with implicitly associated labels, ensure that the label is properly positioned. [Priority 2]
The label must immediately precede its control on the same line (allowing more than one control/label per line) or be in the line preceding the control (with only one label and one control per line).
Refer also to checkpoint 12.4.
Techniques for checkpoint 10.2

10.3 *Until user agents* (including assistive technologies) render side-by-side text correctly, provide a linear text alternative (on the current page or some other) for *all* tables that lay out text in parallel, word-wrapped columns. [Priority 3]
Note. Please consult the definition of *linearized table*. This checkpoint benefits people with *user agents* (such as some *screen readers*) that are unable to handle blocks of text presented side-by-side; the checkpoint should not discourage content developers from using tables to represent *tabular information*.
Techniques for checkpoint 10.3

10.4 *Until user agents* handle empty controls correctly, include default, place-holding characters in edit boxes and text areas. [Priority 3]
For example, in HTML, do this for TEXTAREA and INPUT.
Techniques for checkpoint 10.4

10.5 *Until user agents* (including assistive technologies) render adjacent links distinctly, include non-link, printable characters (surrounded by spaces) between adjacent links. [Priority 3]
Techniques for checkpoint 10.5

Guideline 11. Use W3C technologies and guidelines.

Use W3C technologies (according to specification) and follow accessibility

guidelines. Where it is not possible to use a W3C technology, or doing so results in material that does not transform gracefully, provide an alternative version of the content that is accessible.

The current guidelines recommend W3C technologies (e.g., HTML, CSS, etc.) for several reasons:

- W3C technologies include "built-in" accessibility features.
- W3C specifications undergo early review to ensure that accessibility issues are considered during the design phase.
- W3C specifications are developed in an open, industry consensus process.

Many non-W3C formats (e.g., PDF, Shockwave, etc.) require viewing with either plug-ins or stand-alone applications. Often, these formats cannot be viewed or navigated with standard *user agents* (including *assistive technologies*). Avoiding non-W3C and non-standard features (proprietary elements, attributes, properties, and extensions) will tend to make pages more accessible to more people using a wider variety of hardware and software. When inaccessible technologies (proprietary or not) must be used, equivalent accessible pages must be provided.

Even when W3C technologies are used, they must be used in accordance with accessibility guidelines. When using new technologies, ensure that they transform gracefully (Refer also to guideline 6.).

Note. Converting documents (from PDF, PostScript, RTF, etc.) to W3C markup languages (HTML, XML) does not always create an accessible document. Therefore, validate each page for accessibility and usability after the conversion process (refer to the section on validation). If a page does not readily convert, either revise the page until its original representation converts appropriately or provide an HTML or plain text version.

Checkpoints:

11.1 Use W3C technologies when they are available and appropriate for a task and use the latest versions when supported. [Priority 2]
Refer to the list of references for information about where to find the latest W3C specifications and [WAI-UA-SUPPORT] for information about user agent support for W3C technologies.
Techniques for checkpoint 11.1

11.2 Avoid deprecated features of W3C technologies. [Priority 2]
For example, in HTML, don't use the *deprecated* FONT element; use style sheets instead (e.g., the 'font' property in CSS).
Techniques for checkpoint 11.2

11.3 Provide information so that users may receive documents according to their preferences (e.g., language, content type, etc.) [Priority 3]
Note. Use content negotiation where possible.
Techniques for checkpoint 11.3

11.4 If, after best efforts, you cannot create an *accessible* page, provide a link to an alternative page that uses W3C technologies, is accessible, has *equivalent* information (or functionality), and is updated as often as

the inaccessible (original) page. [Priority 1]
Techniques for checkpoint 11.4

Note. Content developers should only resort to alternative pages when other solutions fail because alternative pages are generally updated less often than "primary" pages. An out-of-date page may be as frustrating as one that is inaccessible since, in both cases, the information presented on the original page is unavailable. Automatically generating alternative pages may lead to more frequent updates, but content developers must still be careful to ensure that generated pages always make sense, and that users are able to navigate a site by following links on primary pages, alternative pages, or both. Before resorting to an alternative page, reconsider the design of the original page; making it accessible is likely to improve it for all users.

Guideline 12. Provide context and orientation information.

Provide context and orientation information to help users understand complex pages or elements.

Grouping elements and providing contextual information about the relationships between elements can be useful for all users. Complex relationships between parts of a page may be difficult for people with cognitive disabilities and people with visual disabilities to interpret.

Checkpoints:

12.1 Title each frame to facilitate frame identification and navigation. [Priority 1]
For example, in HTML use the "title" attribute on FRAME elements.
Techniques for checkpoint 12.1

12.2 Describe the purpose of frames and how frames relate to each other if it is not obvious by frame titles alone. [Priority 2]
For example, in HTML, use "longdesc," or a *description link*.
Techniques for checkpoint 12.2

12.3 Divide large blocks of information into more manageable groups where natural and appropriate. [Priority 2]
For example, in HTML, use OPTGROUP to group OPTION elements inside a SELECT; group form controls with FIELDSET and LEGEND; use nested lists where appropriate; use headings to structure documents, etc. Refer also to guideline 3.
Techniques for checkpoint 12.3

12.4 Associate labels explicitly with their controls. [Priority 2]
For example, in HTML use LABEL and its "for" attribute.
Techniques for checkpoint 12.4

Guideline 13. Provide clear navigation mechanisms.

Provide clear and consistent navigation mechanisms -- orientation information, navigation bars, a site map, etc. -- to increase the likelihood that a person will find what they are looking for at a site.

Clear and consistent *navigation mechanisms* are important to people with cognitive disabilities or blindness, and benefit all users.

Checkpoints:

13.1 Clearly identify the target of each link. [Priority 2]
Link text should be meaningful enough to make sense when read out of context -- either on its own or as part of a sequence of links. Link text should also be terse.
For example, in HTML, write "Information about version 4.3" instead of "click here". In addition to clear link text, content developers may further clarify the target of a link with an informative link title (e.g., in HTML, the "title" attribute).
Techniques for checkpoint 13.1

13.2 Provide metadata to add semantic information to pages and sites. [Priority 2]
For example, use RDF ([RDF]) to indicate the document's author, the type of content, etc.
Note. Some HTML *user agents* can build navigation tools from document relations described by the HTML LINK element and "rel" or "rev" attributes (e.g., rel="next", rel="previous", rel="index", etc.).
Refer also to checkpoint 13.5.
Techniques for checkpoint 13.2

13.3 Provide information about the general layout of a site (e.g., a site map or table of contents). [Priority 2]
In describing site layout, highlight and explain available accessibility features.
Techniques for checkpoint 13.3

13.4 Use navigation mechanisms in a consistent manner. [Priority 2]
Techniques for checkpoint 13.4

13.5 Provide navigation bars to highlight and give access to the navigation mechanism. [Priority 3]
Techniques for checkpoint 13.5

13.6 Group related links, identify the group (for user agents), and, *until user agents* do so, provide a way to bypass the group. [Priority 3]
Techniques for checkpoint 13.6

13.7 If search functions are provided, enable different types of searches for different skill levels and preferences. [Priority 3]
Techniques for checkpoint 13.7

13.8 Place distinguishing information at the beginning of headings, paragraphs, lists, etc. [Priority 3]
Note. This is commonly referred to as "front-loading" and is especially helpful for people accessing information with serial

devices such as speech synthesizers.
Techniques for checkpoint 13.8

13.9 Provide information about document collections (i.e., documents comprising multiple pages.). [Priority 3]
For example, in HTML specify document collections with the LINK element and the "rel" and "rev" attributes. Another way to create a collection is by building an archive (e.g., with zip, tar and gzip, stuffit, etc.) of the multiple pages.
Note. The performance improvement gained by offline processing can make browsing much less expensive for people with disabilities who may be browsing slowly.
Techniques for checkpoint 13.9

13.10 Provide a means to skip over multi-line ASCII art. [Priority 3]
Refer to checkpoint 1.1 and the example of ascii art in the glossary.
Techniques for checkpoint 13.10

Guideline 14. Ensure that documents are clear and simple.

Ensure that documents are clear and simple so they may be more easily understood.

Consistent page layout, recognizable graphics, and easy to understand language benefit all users. In particular, they help people with cognitive disabilities or who have difficulty reading. (However, ensure that images have text equivalents for people who are blind, have low vision, or for any user who cannot or has chosen not to view graphics. Refer also to guideline 1.)

Using clear and simple language promotes effective communication. Access to written information can be difficult for people who have cognitive or learning disabilities. Using clear and simple language also benefits people whose first language differs from your own, including those people who communicate primarily in sign language.

Checkpoints:

14.1 Use the clearest and simplest language appropriate for a site's content. [Priority 1]
Techniques for checkpoint 14.1

14.2 Supplement text with graphic or auditory presentations where they will facilitate comprehension of the page. [Priority 3]
Refer also to guideline 1.
Techniques for checkpoint 14.2

14.3 Create a style of presentation that is consistent across pages. [Priority 3]
Techniques for checkpoint 14.3

Appendix A. -- Validation

Validate accessibility with automatic tools and human review. Automated methods are generally rapid and convenient but cannot identify all accessibility issues. Human review can help ensure clarity of language and ease of navigation.

Begin using validation methods at the earliest stages of development. Accessibility issues identified early are easier to correct and avoid.

Following are some important validation methods, discussed in more detail in the section on validation in the Techniques Document.

1. Use an automated accessibility tool and browser validation tool. Please note that software tools do not address all accessibility issues, such as the meaningfulness of link text, the applicability of a *text equivalent*, etc.
2. Validate syntax (e.g., HTML, XML, etc.).
3. Validate style sheets (e.g., CSS).
4. Use a text-only browser or emulator.
5. Use multiple graphic browsers, with:
   - sounds and graphics loaded,
   - graphics not loaded,
   - sounds not loaded,
   - no mouse,
   - frames, scripts, style sheets, and applets not loaded
6. Use several browsers, old and new.
7. Use a self-voicing browser, a screen reader, magnification software, a small display, etc.
8. Use spell and grammar checkers. A person reading a page with a speech synthesizer may not be able to decipher the synthesizer's best guess for a word with a spelling error. Eliminating grammar problems increases comprehension.
9. Review the document for clarity and simplicity. Readability statistics, such as those generated by some word processors may be useful indicators of clarity and simplicity. Better still, ask an experienced (human) editor to review written content for clarity. Editors can also improve the usability of documents by identifying potentially sensitive cultural issues that might arise due to language or icon usage.
10. Invite people with disabilities to review documents. Expert and novice users with disabilities will provide valuable feedback about accessibility or usability problems and their severity.

Appendix B. -- Glossary

Accessible

Content is accessible when it may be used by someone with a disability.

Applet

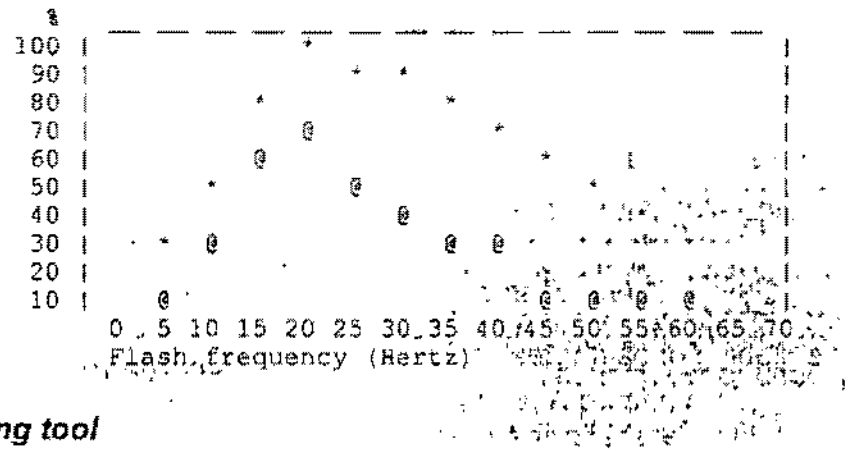
A program inserted into a Web page.

Assistive technology

Software or hardware that has been specifically designed to assist people with disabilities in carrying out daily activities. Assistive technology includes wheelchairs, reading machines, devices for grasping, etc. In the area of Web Accessibility, common software-based assistive technologies include screen readers, screen magnifiers, speech synthesizers, and voice input software that operate in conjunction with graphical desktop browsers (among other *user agents*). Hardware assistive technologies include alternative keyboards and pointing devices.

ASCII art

ASCII art refers to text characters and symbols that are combined to create an image. For example ";-)" is the smiley emoticon. The following is an ascii figure showing the relationship between flash frequency and photoconvulsive response in patients with eyes open and closed [skip over ascii figure or consult a description of chart]:



Authoring tool

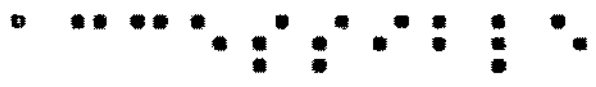
HTML editors, document conversion tools, tools that generate Web content from databases are all authoring tools. Refer to the "Authoring Tool Accessibility Guidelines" ([WAI-AUTOOLS]) for information about developing accessible tools.

Backward compatible

Design that continues to work with earlier versions of a language, program, etc.

Braille

Braille uses six raised dots in different patterns to represent letters and numbers to be read by people who are blind with their fingertips. The word "Accessible" in braille follows:



A ***braille display***, commonly referred to as a "dynamic braille display," raises or lowers dot patterns on command from an electronic device, usually a computer. The result is a line of braille that can change from moment to

moment. Current dynamic braille displays range in size from one cell (six or eight dots) to an eighty-cell line, most having between twelve and twenty cells per line.

Content developer

Someone who authors Web pages or designs Web sites.

Deprecated

A deprecated element or attribute is one that has been outdated by newer constructs. Deprecated elements may become obsolete in future versions of HTML. The index of HTML elements and attributes in the Techniques Document indicates which elements and attributes are deprecated in HTML 4.0.

Authors should avoid using deprecated elements and attributes. User agents should continue to support for reasons of backward compatibility.

Device independent

Users must be able to interact with a user agent (and the document it renders) using the supported input and output devices of their choice and according to their needs. Input devices may include pointing devices, keyboards, braille devices, head wands, microphones, and others. Output devices may include monitors, speech synthesizers, and braille devices. Please note that "device-independent support" does not mean that user agents must support every input or output device. User agents should offer redundant input and output mechanisms for those devices that are supported. For example, if a user agent supports keyboard and mouse input, users should be able to interact with all features using either the keyboard or the mouse.

Document Content, Structure, and Presentation

The content of a document refers to what it says to the user through natural language, images, sounds, movies, animations, etc. The structure of a document is how it is organized logically (e.g., by chapter, with an introduction and table of contents, etc.). An *element* (e.g., P, STRONG, BLOCKQUOTE in HTML) that specifies document structure is called a structural element. The presentation of a document is how the document is rendered (e.g., as print, as a two-dimensional graphical presentation, as an text-only presentation, as synthesized speech, as braille, etc.) An *element* that specifies document presentation (e.g., B, FONT, CENTER) is called a presentation element.

Consider a document header, for example. The content of the header is what the header says (e.g., "Sailboats"). In HTML, the header is a structural element marked up with, for example, an H2 element. Finally, the presentation of the header might be a bold block text in the margin, a centered line of text, a title spoken with a certain voice style (like an aural font), etc.

Dynamic HTML (DHTML)

DHTML is the marketing term applied to a mixture of standards including HTML, *style sheets*, the Document Object Model [DOM1] and scripting. However, there is no W3C specification that formally defines DHTML. Most guidelines may be applicable to applications using DHTML, however the following guidelines focus on issues related to scripting and style sheets: guideline 1, guideline 3, guideline 6, guideline 7, and guideline 9.

Element

This document uses the term "element" both in the strict SGML sense (an element is a syntactic construct) and more generally to mean a type of content (such as video or sound) or a logical construct (such as a header or list). The second sense emphasizes that a guideline inspired by HTML could easily apply to another markup language.

Note that some (SGML) elements have content that is rendered (e.g., the P, LI, or TABLE elements in HTML), some are replaced by external content (e.g., IMG), and some affect processing (e.g., STYLE and SCRIPT cause information to be processed by a style sheet or script engine). An element that causes text characters to be part of the document is called a text element.

Equivalent

Content is "equivalent" to other content when both fulfill essentially the same function or purpose upon presentation to the user. In the context of this document, the equivalent must fulfill essentially the same function for the person with a disability (at least insofar as is feasible, given the nature of the disability and the state of technology), as the primary content does for the person without any disability. For example, the text "The Full Moon" might convey the same information as an image of a full moon when presented to users. Note that equivalent information focuses on **fulfilling the same function**. If the image is part of a link and understanding the image is crucial to guessing the link target, an equivalent must also give users an idea of the link target. Providing equivalent information for inaccessible content is one of the primary ways authors can make their documents accessible to people with disabilities.

As part of fulfilling the same function of content an equivalent may involve a description of that content (i.e., what the content looks like or sounds like). For example, in order for users to understand the information conveyed by a complex chart, authors should describe the visual information in the chart. Since text content can be presented to the user as synthesized speech, braille, and visually-displayed text, these guidelines require ***text equivalents*** for graphic and audio information. Text equivalents must be written so that they convey all essential content. ***Non-text equivalents*** (e.g., an auditory description of a visual presentation, a video of a person telling a story using sign language as an equivalent for a written story, etc.) also improve accessibility for people who cannot access visual information or written text, including many individuals with blindness, cognitive disabilities, learning disabilities, and deafness.

Equivalent information may be provided in a number of ways, including through attributes (e.g., a text value for the "alt" attribute in HTML and SMIL), as part of element content (e.g., the OBJECT in HTML), as part of the document's prose, or via a linked document (e.g., designated by the "longdesc" attribute in HTML or a *description link*). Depending on the complexity of the equivalent, it may be necessary to combine techniques (e.g., use "alt" for an abbreviated equivalent, useful to familiar readers, in addition to "longdesc" for a link to more complete information, useful to first-time readers). The details of how and when to provide equivalent information are part of the Techniques Document ([TECHNIQUES]).

A ***text transcript*** is a text equivalent of audio information that includes

spoken words and non-spoken sounds such as sound effects. A ***caption*** is a text transcript for the audio track of a video presentation that is synchronized with the video and audio tracks. Captions are generally rendered visually by being superimposed over the video, which benefits people who are deaf and hard-of-hearing, and anyone who cannot hear the audio (e.g., when in a crowded room). A ***collated text transcript*** combines (collates) captions with text descriptions of video information (descriptions of the actions, body language, graphics, and scene changes of the video track). These text equivalents make presentations accessible to people who are deaf-blind and to people who cannot play movies, animations, etc. It also makes the information available to search engines.
One example of a non-text equivalent is an ***auditory description*** of the key visual elements of a presentation. The description is either a prerecorded human voice or a synthesized voice (recorded or generated on the fly). The auditory description is synchronized with the audio track of the presentation, usually during natural pauses in the audio track. Auditory descriptions include information about actions, body language, graphics, and scene changes.

Image

A graphical presentation.

Image map

An image that has been divided into regions with associated actions. Clicking on an active region causes an action to occur.
When a user clicks on an active region of a client-side image map, the user agent calculates in which region the click occurred and follows the link associated with that region. Clicking on an active region of a server-side image map causes the coordinates of the click to be sent to a server, which then performs some action.
Content developers can make client-side image maps accessible by providing device-independent access to the same links associated with the image map's regions. Client-side image maps allow the user agent to provide immediate feedback as to whether or not the user's pointer is over an active region.

Important

Information in a document is important if understanding that information is crucial to understanding the document.

Linearized table

A table rendering process where the contents of the cells become a series of paragraphs (e.g., down the page) one after another. The paragraphs will occur in the same order as the cells are defined in the document source. Cells should make sense when read in order and should include structural elements (that create paragraphs, headers, lists, etc.) so the page makes sense after linearization.

Link text

The rendered text content of a link.

Natural Language

Spoken, written, or signed human languages such as French, Japanese, American Sign Language, and braille. The natural language of content may be indicated with the "lang" attribute in HTML ([HTML40], section 8.1) and

the "xml:lang" attribute in XML ([XML], section 2.12).

Navigation Mechanism

A navigation mechanism is any means by which a user can navigate a page or site. Some typical mechanisms include:

navigation bars

A navigation bar is a collection of links to the most important parts of a document or site.

site maps

A site map provides a global view of the organization of a page or site.

tables of contents

A table of contents generally lists (and links to) the most important sections of a document.

Personal Digital Assistant (PDA)

A PDA is a small, portable computing device. Most PDAs are used to track personal data such as calendars, contacts, and electronic mail. A PDA is generally a handheld device with a small screen that allows input from various sources.

Screen magnifier

A software program that magnifies a portion of the screen, so that it can be more easily viewed. Screen magnifiers are used primarily by individuals with low vision.

Screen reader

A software program that reads the contents of the screen aloud to a user. Screen readers are used primarily by individuals who are blind. Screen readers can usually only read text that is printed, not painted, to the screen.

Style sheets

A style sheet is a set of statements that specify presentation of a document. Style sheets may have three different origins: they may be written by content providers, created by users, or built into user agents. In CSS ([CSS2]), the interaction of content provider, user, and user agent style sheets is called the *cascade*.

Presentation markup is markup that achieves a stylistic (rather than structuring) effect such as the B or I elements in HTML. Note that the STRONG and EM elements are not considered presentation markup since they convey information that is independent of a particular font style.

Tabular information

When tables are used to represent logical relationships among data -- text, numbers, images, etc., that information is called "tabular information" and the tables are called "data tables". The relationships expressed by a table may be rendered visually (usually on a two-dimensional grid), aurally (often preceding cells with header information), or in other formats.

Until user agents ...

In most of the checkpoints, content developers are asked to ensure the accessibility of their pages and sites. However, there are accessibility needs that would be more appropriately met by *user agents* (including *assistive technologies*). As of the publication of this document, not all user agents or assistive technologies provide the accessibility control users require (e.g., some user agents may not allow users to turn off blinking content, or some screen readers may not handle tables well). Checkpoints that contain the

phrase "until user agents ..." require content developers to provide additional support for accessibility until most user agents readily available to their audience include the necessary accessibility features.

Note. The W3C WAI Web site (refer to [WAI-UA-SUPPORT]) provides information about user agent support for accessibility features. Content developers are encouraged to consult this page regularly for updated information.

User agent

Software to access Web content, including desktop graphical browsers, text browsers, voice browsers, mobile phones, multimedia players, plug-ins, and some software assistive technologies used in conjunction with browsers such as screen readers, screen magnifiers, and voice recognition software.

Acknowledgments

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The original draft of this document is based on "The Unified Web Site Accessibility Guidelines" ([UWSAG]) compiled by the Trace R & D Center at the University of Wisconsin. That document includes a list of additional contributors.

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W3C WAI-AAA WCAG 1.0

[contents] [checklist]

Questions Prepared for Sec. Riley for testimony on K-4 ESEA

Question: What is the Department's position on bilingual education and "English first" issues? Since the purpose of bilingual education is to provide students with a knowledge of English, shouldn't most funding go towards promoting English competency?

Answer: English language competency must be a part of all Department programs which serve limited English proficient (LEP) students. However, instruction must ensure that children achieve to high content standards. Programs that emphasize English language development often do not lead to content mastery. Of course, the determination as to instructional methodology to be used with LEP students is one that is left to the discretion of state and local officials.

Our latest research demonstrates that bilingual education permits the achievement of both these goals. Instruction in the native language in the content areas (math, science, social studies, etc.) coupled with English language instruction produces higher academic gains and enhanced family involvement (US Dept of Ed study, 1991). It allows children to transition into the mainstream English curriculum without falling academically behind.

Question: What is your position on the education of illegal immigrants? Shouldn't the federal government pay for their education due to their inability to patrol the border effectively? In particular, what is your view of California's Proposition 187?

Answer: In Plyler v. Doe (1982), the Supreme Court held that schools cannot exclude K-12 students on the basis of their citizenship or residency status. I believe that states should comply with the Supreme Court decision.

I understand the strong concerns relating to illegal immigration. I do not condone illegal immigration. This administration will be vigilant in protecting this nation's borders from illegal immigration.

However, the solution to the problem is not to punish children of illegal aliens by denying them an education.

As for financial responsibility.-- we embrace the same federal/state/local "partnership" philosophy with regard to K-12 immigrant students as we do to all of America's students. The Department should and does provide assistance to states and school districts affected by immigrant students through the Emergency Immigrant Education Program, Title VII, and Title I, to name a few.

As for Proposition 187 -- I am concerned that its implementation would result in a policing environment in schools, diverting both fiscal and human resources from the vital task of education our children. The environment would have a "chilling" effect on any partnership efforts, with families and the community, to improve our schools.

NOTE: You should not express an opinion on whether the United States should intervene in the litigation on Prop. 187 or what position it should take if it does.

DEPARTMENT OF EDUCATION (ED)

FY99/00 Annual Performance Report Summary

NOTE TO THE READER

The White House Initiative chose to address the Department of Education's FY99/00 Report submission differently than other agencies' summaries. Given its unique mission to ensure equal access to and promote excellence in education, we have included the Department of Education's submission to the White House Initiative in its entirety in Appendix A. Including the entire report offers the reader an opportunity to evaluate the Department of Education's efforts and hold it accountable in fulfilling its mission.

- **ACTION PLAN ACHIEVEMENTS**

In FY98, the Department of Education (ED) committed to continuing efforts to increase the educational attainment of Latinos. While the ED did not identify specific measurable goals and objectives to be achieved in FY99, ED provided a thorough review on how it has supported Latinos in education over the past several years in its FY99/00 Annual Performance Report. ED's report reflects a closer alignment of the key issues and strategies that will allow the Department to better assess its impact on increasing the education attainment of Latino students. ED's FY99/00 Report also reflects a more concerted effort on its part to work with the White House Initiative and the Office of Management and Budget in relaying its leadership role in providing resources to meet the education needs of all students, including Latinos.

- **PROGRAMS AND ACTIVITIES**

The Department of Education worked to implement the Hispanic Education Action Plan (HEAP) and to redirect investments and program-level changes designed to improve the educational achievement of Latinos. Its implementation strategies include setting program objectives, creating strategies to reach the objectives, and applying performance indicators to measure progress. ED also made steps to institutionalize activities that improve both the extent and quality of Latino participation in federal education programs.

Programs currently covered by HEAP include:

--Title I Grants to Local Educational Agencies
--21st Century Community Learning Centers
--Bilingual Education
--Migrant Education
--High School Equivalency Program
--College Assistance Migrant Program
--GEAR UP
--TRIO
--Adult Education

--Developing Hispanic-Serving Institutions

As ED expands its commitment to better serve the educational needs of Hispanic Americans, it will develop additional programs that have potential for significantly impacting the educational achievement of Hispanics.

- CONTRIBUTIONS TO HISPANIC SERVING INSTITUTIONS (HSIs)

Total awards to HSIs for: Research and Development, Program Evaluation, Training, Facilities and Equipment, Fellowships, Recruitment and IPAs, Student and Tuition Assistance, Scholarships, Administrative/Research, Infrastructure

	Awards to Institutions of Higher Education (IHEs)	Awards to IHEs for Hispanic Activities	Awards to HSIs	Awards to HSIs as a % of total awards to IHEs
FY98	$1,180,808,290	no data reported	$110,597,000	9.4
FY99	$1,598,624,644	no data reported	$155,777,000	9.7
% change	35.0	--	41.0	

The Department of Education's Developing HSI Program makes five-year development grants to help support for the following:

--Scientific or laboratory equipment for educational purposes;
--Renovation of instructional facilities;
--Faculty development;
--Management improvements (including purchase of equipment);
--Development and improvement of academic programs;
--Joint use of facilities, academic tutoring, counseling programs, and student support services.

The program also makes a limited number of one-year planning grants.

- EMPLOYMENT OF HISPANICS

	Career Employees	% Hispanic	Non-Career Employees	% Hispanic
FY98	152 of 3,630	4.1	11 of 146	7.5
FY99	174 of 4,356	4.0	13 of 146	8.9

- FUTURE INVESTMENTS

Under the Hispanic Education Action Plan, ED will continue to increase its investment in programs and activities that expand educational opportunities for Hispanic students. The following tables summarize key investments and the plans for using those investments to improve educational opportunities and outcomes for Hispanic Americans.

	FY00	FY01 Request
Title I	$7.9 billion (+$209m)	$8.4 billion (+$416m)

Objective: Strengthen effectiveness of Title I in helping Hispanic students reach high standards.
Indicator: By 2002, 32 states will report disaggregated achievement data showing an increase in the percentage of students in high-poverty schools—including Hispanic students—meeting the proficient and advanced levels on state reading and math assessments.
Strategies:

- Strengthen enforcement of Title I provisions requiring states to hold Local Education Agencies (LEAs) and schools accountable for academic performance of Hispanic and Limited English Proficient (LEP) students.
- Issue guidance and provide technical assistance on inclusion of Hispanic LEP students in assessment systems and testing of LEP students in their native language.
- State integrated review process will give priority to assessment policies and services to LEP students.
- Disseminate best practices for meeting educational needs of Hispanic and LEP students to LEAs and schools, particularly in areas with rapidly growing Hispanic enrollments.

	FY99	FY00	FY01 Request
21st Century Community Learning Centers	$200 million (+$160m)	$453 million (+$253m)	$1 billion (+$547m)

Objective: Increase participation of LEP students in the FY00 competition to 25-30 percent.
Indicator: The proportion of LEP students served will increase with each competition through FY01.
Strategies:

- Give priority to applicants serving communities at risk of educational failure, particularly those with high drop-out rates and high concentrations of LEP students.
- Work with National Association for Bilingual Education to design and coordinate more than 50 outreach and technical assistance workshops targeted to communities with large Hispanic populations.
- Recruit reviewers with strong understanding of how to meet educational needs of Hispanic youth.

Bilingual Education	FY99	FY00	FY01 Request
	$224 million (+$25m)	$248 million (+$24m)	$296 million (+$48m)

Objective: Help linguistically diverse children learn English and achieve to the same high standards required of all children.
Indicator: LEP students participating in Title VII for at least 3 years will perform comparably to non-LEP students on state assessments.
Strategies:

- Identify and highlight promising practices in coordination with the National Clearinghouse on Bilingual Education and the National Association for Bilingual Education.
- Increase outreach to parents and teachers, including a guide on the inclusion of LEP students in standards-based reform efforts. Solicit Professional Development grant proposals from IHEs and other organizations serving areas with large unmet need for bilingual and ESL instructors, as well as areas experiencing new and rapid growth in LEP populations.

Migrant Education Program (MEP)	FY99	FY00	FY01 Request
	$355 million (+$49m)	$355 million	$380 million (+$25m)

Objective: Improve academic achievement and school completion of migrant children.
Indicator: Increasing percentages of migrant students will meet or exceed the basic or proficient levels on state assessments.
Strategies:

- Ensure inclusion of migrant children in state assessment systems through guidance and technical assistance on meeting Title I requirements.
- Encourage integration of migrant education program funds and services within comprehensive school reforms, including Title I school-wide programs and the Comprehensive School Reform Demonstration program.
- Provide incentives for summer-term and inter-session programs, and for multi-state consortia that will work to ensure education continuity for migrant students.
- Work to improve program coordination, including innovative uses of technology and October 2000 pilot of consolidated database to assist in migrant student record transfer.

	FY99	FY00	FY01 Request
High School Equivalency Program (HEP)	$9 million (+$1.4m)	$15 million (+$6m)	$20 million (+$5m)

Objective: Help migrant and seasonal farmworker students—a majority of whom are Hispanic—obtain a General Education Development (GED) certificate.
Indicator: The percentage of HEP participants—including Hispanics—who complete the program and receive a GED will remain high or increase.
Strategies:

- Expand technical assistance to current and new HEP grantees.

	FY99	FY00	FY01 Request
College Assistance Migrant Program (CAMP)	$4 million (+$1.9m)	$7 million (+$3m)	$10 million (+$3m)

Objective: Help migrant and seasonal farmworkers—a majority of whom are Hispanic—complete their first year of college and continue in postsecondary education.
Indicator: The percentage of CAMP participants who complete the program and continue in postsecondary education will increase.
Strategies:

- Increase technical assistance to improve services to Hispanics, in part through outreach to increase the number of HSIs operating CAMP projects.
- Monitor new projects and provide assistance where needed.

	FY99	FY00	FY01 Request
TRIO Programs	$600 million (+$70m)	$645 million (+$45m)	$725 million (+$80m)

Objective: Improve access to and quality of TRIO programs for Hispanic and LEP students.
Indicator: The proportion of under-served groups—including Hispanic and LEP students—participating in TRIO programs will increase.
Strategies:

- Improve data collection to better track participation and outcomes of Hispanics in TRIO programs.
- Target technical assistance workshops to geographic areas with large numbers of Hispanics.
- Improve dissemination of promising practices for reaching underserved populations, including Hispanics, recent immigrants, LEP students, and individuals with disabilities.
- Develop partnerships with Hispanic advocacy groups to help identify proposal reviewers knowledgeable about Hispanic education issues.

Developing Hispanic-Serving Institutions (HSIs)	FY99	FY00	FY01 Request
	$28 million (+$16m)	$42.2 million (+$14.3m)	$62.5 million (+$20.3m)

Objective: To provide the financial support and technical assistance needed to help HSIs expand their capacity to effectively serve Hispanic and low-income students.
Indicator: The number of HSIs receiving five-year development grants will increase each year.
Strategies:

- Provide technical assistance and outreach to expand the grantee applicant pool and improve the quality of applications, including monthly meetings with the Hispanic Association of Colleges and Universities.

GEAR UP	FY99	FY00	FY01 Request
	$120 million	$200 million	$325 million

Objective: Maximize participation of Hispanic youth in awarded projects.
Indicator: The number of awards to HSIs or partnerships involving HSIs will increase each year through FY01.
Strategies:

- Track and evaluate participation of Hispanic and LEP students in funded projects.
- Expand outreach to Hispanic communities and HSIs through targeted mailings and workshops, such as the February 2000 workshop in Edinburgh, Texas coordinated with the National Council for Community Education and Partnerships.
- Partner with Hispanic advocacy groups and community-based organizations to identify grant proposal reviewers knowledgeable about Hispanic communities and education issues.

Adult Education	FY99	FY00	FY01 Request
	$385 million (+$24m)	$470 million	$556 million

Objective: Help LEP adults, including Hispanics, become literate in English and develop the knowledge and skills necessary to succeed in the global economy and exercise the rights and responsibilities of citizenship.
Indicator: In 2000-01, 40 percent of adults in beginning English for Speakers of Other Languages programs will complete and achieve basic literacy.
Strategies:

- Increase access to high-quality adult education programs by disseminating best practices from current study of promising English-as-a-second-language programs.
- Supporting innovation in adult education through a new demonstration focused on teaching literacy in the context of citizenship education.