STATS IN BRIEF

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A Description of U.S. Adults Who Are Not Digitally Literate

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Statistics in Brief publications present descriptive data in tabular formats to provide useful information to a broad audience, including members of the general public. They address simple and topical issues and questions. They do not investigate more complex hypotheses, account for inter-relationships among variables, or support causal inferences. We encourage readers who are interested in more complex questions and in-depth analysis to explore other NCES resources, including publications, online data tools, and public- and restricted-use datasets. See nces.ed.gov and references noted in the body of this document for more information.

In the United States

and internationally, digital technologies are pervasive both at home and at work. For many adults, it is hard to imagine not going online for everything from finding recipes to trading stocks. To understand how equipped adults are for successful participation in 21st-century society and the global economy, the Organization for Economic Cooperation and Development (OECD; see exhibit 1) developed the Program for the International Assessment of Adult Competencies (PIAAC). PIAAC measures the key cognitive and workplace skills of reading literacy, numeracy (the ability to understand and work with numbers), and—for the first time in an international study—adults' ability to solve problems using computer technologies. The OECD refers to this third skill as "problem solving in a technology rich environment." This Brief uses the simpler term "digital problem solving." PIAAC assesses digital problem solving by simulating tasks commonly performed in computer-based settings, such as e-mailing, interacting with websites, and using spreadsheets, to solve real-world problems such as purchasing goods or services, finding health information, and managing personal information and business finances. For example, PIAAC asked adults to sort e-mails into appropriate folders based on their content and to determine how to return a lamp purchased from an online store.[1]

[1] The framework for the development of the PIAAC assessment and examples of assessment items are available in OECD (2012); example items are also available in Goodman et al. (2013).

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EXHIBIT 1.

The Organization for Economic Cooperation and Development (OECD)

The OECD has its roots in the Organization for European Economic Cooperation (OEEC), which began in 1948 to help implement the post-World War II Marshall Plan and to encourage cooperative economic development among European countries. The success of the OEEC led to its expansion outside of Europe. In 1961, Canada and the United States joined, and the OEEC became the Organization for Economic Cooperation and Development (OECD). Since then, the OECD has expanded to 35 countries, which work together to "identify problems [that hinder economic growth and stability], discuss and analyze them, and promote policies to solve them" (retrieved August 10, 2016, from http://www.oecd.org/about/history/). As part of its goal to foster prosperity among member states, the OECD maintains a core focus on economic issues, but also examines other issues related to economic success, such as health and education and, more broadly, environmental and social well-being.

In the area of education, the OECD sponsors four data collections in which the United States participates: the Teaching and Learning International Survey (TALIS), a study of teaching and learning environments; the Progress in International Reading Literacy Study (PIRLS), an assessment of reading literacy among fourth-graders; the Program for International Student Assessment (PISA), an assessment of 15-year-olds' reading, mathematics, and science literacy; and the Program for the International Assessment of Adult Competencies, described in this Brief. More information about the OECD is available at http://www.oecd.org/about/.

DIGITAL LITERACY

The premise of the PIAAC digital problem-solving assessment is that in order to operate effectively in today's digital environment, one needs to master foundational computer skills, including (a) skills associated with manipulating input and output devices (e.g., the mouse, the keyboard, and digital displays), (b) awareness of concepts and knowledge of how the digital environment is structured (e.g., files, folders, scrollbars, hyperlinks, and different types of menus and buttons), and (c) the ability to interact effectively with digital information (e.g., how to use commands such as Save, Delete, Open, Close, Move, Highlight, Submit, and Send). Such interaction involves familiarity with electronic texts, images, graphics, and numerical data, as well as the ability to locate, evaluate, and critically judge the validity, accuracy, and appropriateness of accessed information. These skills constitute the core aspects of the digital problem-solving assessment; adults who have at least some fluency with these skills are termed "digitally literate" in this Statistics in Brief. But the focus of this Brief is on adults who do not have these basic computer skills—and could thus not participate in the digital problem-solving assessment—that is, on adults who are not digitally literate. (Readers interested in performance on the digital problem-solving assessment are referred to past OECD reports [OECD 2013, 2015, and 2016] and a recent U.S. report [Rampey et al. 2016]).

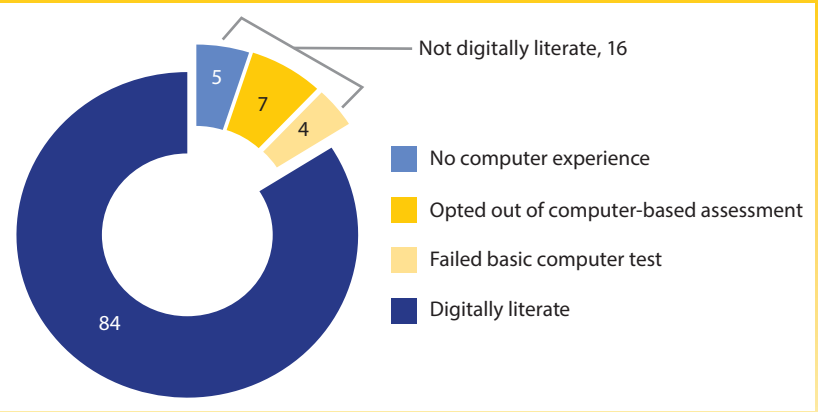
Adults were defined as "not digitally literate" using the requirements that PIAAC established for determining basic computer competence: (1) prior computer use, (2) willingness to take the assessment on the computer, and (3) passing a basic computer test (by successfully completing four of six simple tasks, such as using a mouse and highlighting text on the screen). Adults who met all three of these requirements participated in the digital problem-solving assessment; these adults are classified as digitally literate in this Brief. Adults who did not meet any one of these requirements—who reported no computer use, who were unwilling to take the assessment on the computer, or who failed the basic computer test—did not take the digital problem-solving assessment; these adults are classified as not digitally literate in this Brief.

Findings from the OECD analysis of the 2012 PIAAC show that 16 percent of U.S. adults were not digitally

literate (OECD 2013) (figure 1). Five percent of U.S. adults reported they had no computer experience, 7 percent reported some computer experience but were unwilling to take the assessment on the computer, and 4 percent reported computer experience and were willing to take the assessment on the computer, but failed the basic computer test. The national estimate of 16 percent of adults who are not digitally literate translates into 31.8 million Americans who do not have sufficient comfort or competence with technology to use a computer—these 31.8 million adults are the focus of this Brief.[2]

FIGURE 1.

DIGITAL LITERACY RATES
Percentage distribution of digital literacy status among U.S. adults ages 16–65: 2012



SOURCE: U.S. Department of Education, National Center for Education Statistics, Organization for Economic Cooperation and Development (OECD), Program for the International Assessment of Adult Competencies (PIAAC), 2012.

PREVIOUS RESEARCH

Initial results from PIAAC studies show that, among adults who are digitally literate, adults with the strongest digital problem-solving skills are typically young, are frequent users of information and communication technology, hold a postsecondary degree, and have a parent with a postsecondary degree (OECD 2015, 2013). Digital problem-solving skills are also associated with higher labor force participation rates and higher wages (OECD 2015). Across OECD countries, on average, there is a weak relationship between gender and digital problem solving and no significant correlation between immigrant status and digital problem solving; however, these relationships vary by country (OECD 2015). In the United States, Blacks, Hispanics, the foreign born, and females all have lower levels of digital problem-solving skills than those who are White, U.S. born, or male, even after controlling for age, education, and employment status (Reder 2015).

While previous studies examined adults who are digitally literate, little is known about those who are not digitally literate. As our economy and society become increasingly reliant on technology, it is important to understand who does not have digital literacy skills. A report from the Council of Economic Advisers (2015) notes that although the United States is a world leader of advanced Internet services and technology, the benefits of these technologies do not reach all Americans and a "digital divide" remains, particularly among older, less educated, and less affluent populations, as well as in rural parts of the country.

DATA AND METHODS

The analyses in this Brief use data from the first administration of PIAAC, conducted in 2011–12 in the United States and 23 other OECD and partner countries. The digital problem-solving assessment was administered in 19 out of the 24 participating countries,[3] including the United States. Each country administered PIAAC to a nationally representative sample of adults ages 16 to 65. In the United States, a nationally representative sample of about 5,000 adults between

[2] PIAAC was administered on study-provided laptops. Specifications called for use of a Windows operating system, although Macintosh or Linux operating systems were allowed upon country request; see OECD (2014) for more detail on computer specifications. All respondents were asked to complete PIAAC using the laptops. It is possible that some adults who refused to take the assessment via computer (i.e., adults who "opted out" of the computer-based assessment) may have been digitally literate. However, because it is not possible to distinguish other reasons for not taking the computer-based assessment from digital literacy reasons, in this brief, all respondents who opted out of the computer-based assessment are classified as not digitally literate.

[3] The 19 countries that participated in the digital problem-solving assessment are listed in figures 12–14 later in this Brief. The five PIAAC-participating countries that did not administer this assessment are Cyprus, France, Italy, Spain, and the Russian Federation.

the ages of 16 and 65 took part. The international averages reported later in the Brief were estimated based on the 19 countries that administered the digital problem-solving assessment.[4]

Findings on digital literacy in the United States are examined for adults from a variety of socio-demographic backgrounds. The Brief looks first at the percentage of each socio-demographic group that is not digitally literate (e.g., percentage of native-born versus non-native-born adults who are not digitally literate). Second, the Brief examines the socio-demographic characteristics of adults who are not digitally literate, focusing on where (in which socio-demographic group) the majority of adults who are not digitally literate are found. For example, although non-native-born adults could be more likely than native-born adults to lack digital literacy skills, native-born adults could nonetheless make up a relatively large proportion of the adults who lack these skills.

The findings reported in this Brief are statistically significant at the $p < .05$ level. No adjustments were made for multiple comparisons. For additional information about the data and methods used in this study, see the Technical Notes at the end of the Brief. Appendix A contains the detailed data tables with standard errors.

[4] The international averages weight each country equally.

STUDY QUESTIONS

1. How do different groups of adults in the United States compare on digital literacy?
2. How does the United States compare to other developed countries on digital literacy?
3. How does the United States compare to other developed countries on computer use at work and in everyday life?

KEY FINDINGS

- Adults who are not digitally literate are, on average, less educated, older, and more likely to be Black, Hispanic, or foreign born, compared to digitally literate adults. Compared to digitally literate adults, adults who are not digitally literate have a lower rate of labor force participation and tend to work in lower skilled jobs.
- Compared to adults internationally (i.e., in other OECD countries), a smaller proportion of U.S. adults are not digitally literate. About 16 percent of U.S. adults are not digitally literate, compared to 23 percent of adults internationally. The percentage of U.S. adults who are not digitally literate is not measurably different from the percentages in England/Northern Ireland (UK), Flanders (Belgium), Canada, and Germany. The Netherlands and several Nordic countries (Sweden, Norway, and Denmark) have some of the lowest percentages of adults who are not digitally literate, ranging from 11 to 14 percent.
- Across the countries studied, 71 percent of adults use a computer at work and 83 percent of adults use a computer in everyday life. In comparison, 74 percent of U.S. adults use a computer at work, 3 percentage points higher than the international average, and 81 percent of U.S. adults use a computer in everyday life, 3 percentage points lower than the international average.

1 How do different groups of adults in the United States compare on digital literacy?

This Brief takes two approaches to examine the characteristics of adults who are not digitally literate. First, the Brief examines the *rate* of digital literacy among groups of adults with selected education, demographic, and employment characteristics; this is the percentage of adults within each group who are not digitally literate. Second, the Brief examines the *distribution* of selected education, demographic, and employment characteristics among adults who are not digitally literate; these distributions show which groups make up the largest proportions of adults who are not digitally literate. The two analyses are complementary and tell a similar story: Adults who are not digitally literate are less educated, older, and disproportionately Black, Hispanic, and foreign born, compared to digitally literate adults. In addition, adults who are not digitally literate have lower rates of labor force participation and work in lower skilled jobs than those who are digitally literate.

Educational attainment. Digital literacy among U.S. adults generally increases with educational attainment (figure 2). About two-fifths (41 percent) of U.S. adults without a high school diploma are not digitally literate, compared with 17 percent of adults who have a high school diploma but no college degree, and 5 percent of adults who have a college degree.[5]

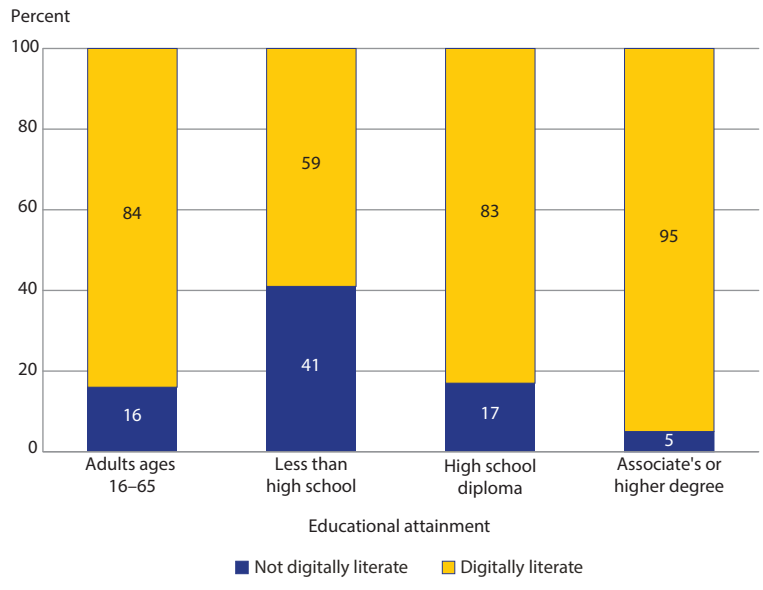
The disparities in digital literacy by educational attainment mean that a relatively high percentage of adults who are not digitally literate have low educational attainment—37 percent of adults who are not digitally literate do not have a high school diploma, compared to 10 percent of digitally literate adults (figure 3). Nonetheless, the most common educational attainment level among adults who are not digitally literate is a high school diploma—53 percent of adults who are not digitally literate have this level of attainment.

Gender. There is no measurable difference in digital literacy rates by gender. Overall, 18 percent of males and 15 percent of females are not digitally literate (figure 4). The population of not-digitally-literate adults is 52 percent male and 48 percent female (figure 5).

Nativity. Although more than twice as many foreign-born adults are not digitally literate compared to native-born adults (36 versus 13 percent, respectively; figure 4), native-born

FIGURE 2.

DIGITAL LITERACY RATES
Rate of digital literacy among U.S. adults ages 16–65, by educational attainment: 2012



SOURCE: U.S. Department of Education, National Center for Education Statistics, Organization for Economic Cooperation and Development (OECD), Program for the International Assessment of Adult Competencies (PIAAC), 2012.

[5] It is important to note that PIAAC includes young adults (ages 16 to 25), many of whom could still be in high school or college. Thus, findings by educational attainment should not be viewed as a proxy for socioeconomic status; they are better viewed as an indicator of the adult's current level of formal skill development.

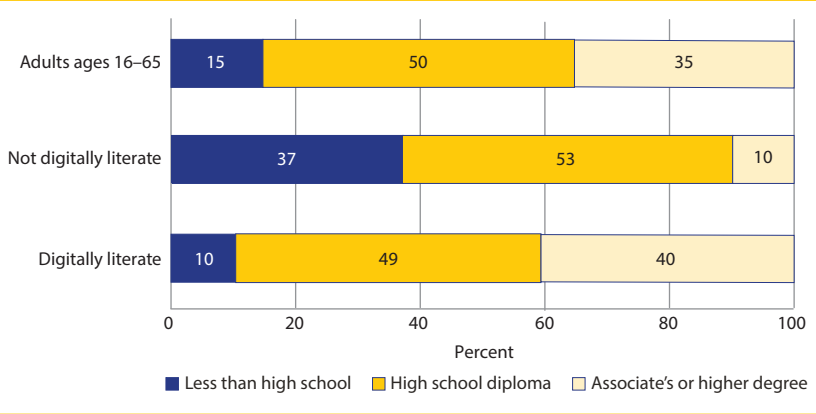
adults represent the majority (68 percent) of adults who are not digitally literate (figure 5).

Age. Among adults ages 16–65, the average age of adults who are not digitally literate is 46, which is 8 years higher than the average age for digitally literate adults (not in tables or figures).[6]

This average age difference reflects the higher rates of digital nonliteracy among older adults (ages 45–65) compared to younger adults (ages 16–34). Because of the higher rate at which older adults are not digitally literate (figure 6), the two oldest groups of adults (ages 45–54 and 55–65) are overrepresented among adults who are not digitally literate. For example, 34 percent of adults who are not digitally literate are ages 55–65, while only 17 percent of adults who are digitally literate are in this age group (figure 7).

FIGURE 3.

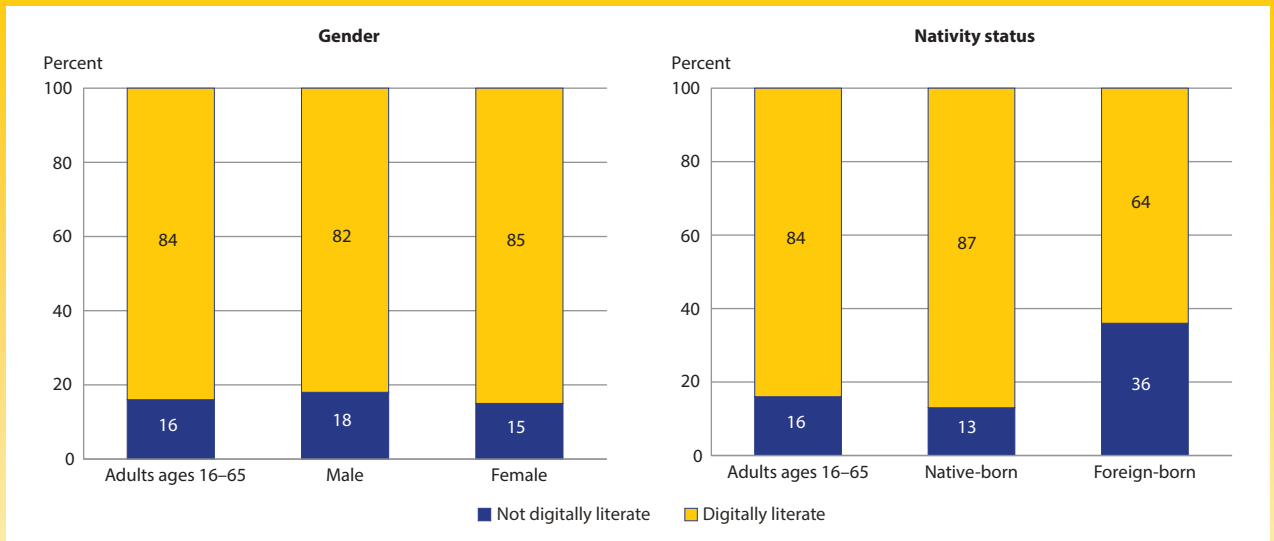
DISTRIBUTION OF EDUCATIONAL ATTAINMENT
Percentage distribution of educational attainment among U.S. adults ages 16–65, by digital literacy status: 2012



NOTE: Detail may not sum to 100 because of rounding.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Organization for Economic Cooperation and Development (OECD), Program for the International Assessment of Adult Competencies (PIAAC), 2012.

FIGURE 4.

DIGITAL LITERACY BY GENDER AND NATIVITY
Rate of digital literacy among U.S. adults ages 16–65, by gender and by nativity status: 2012

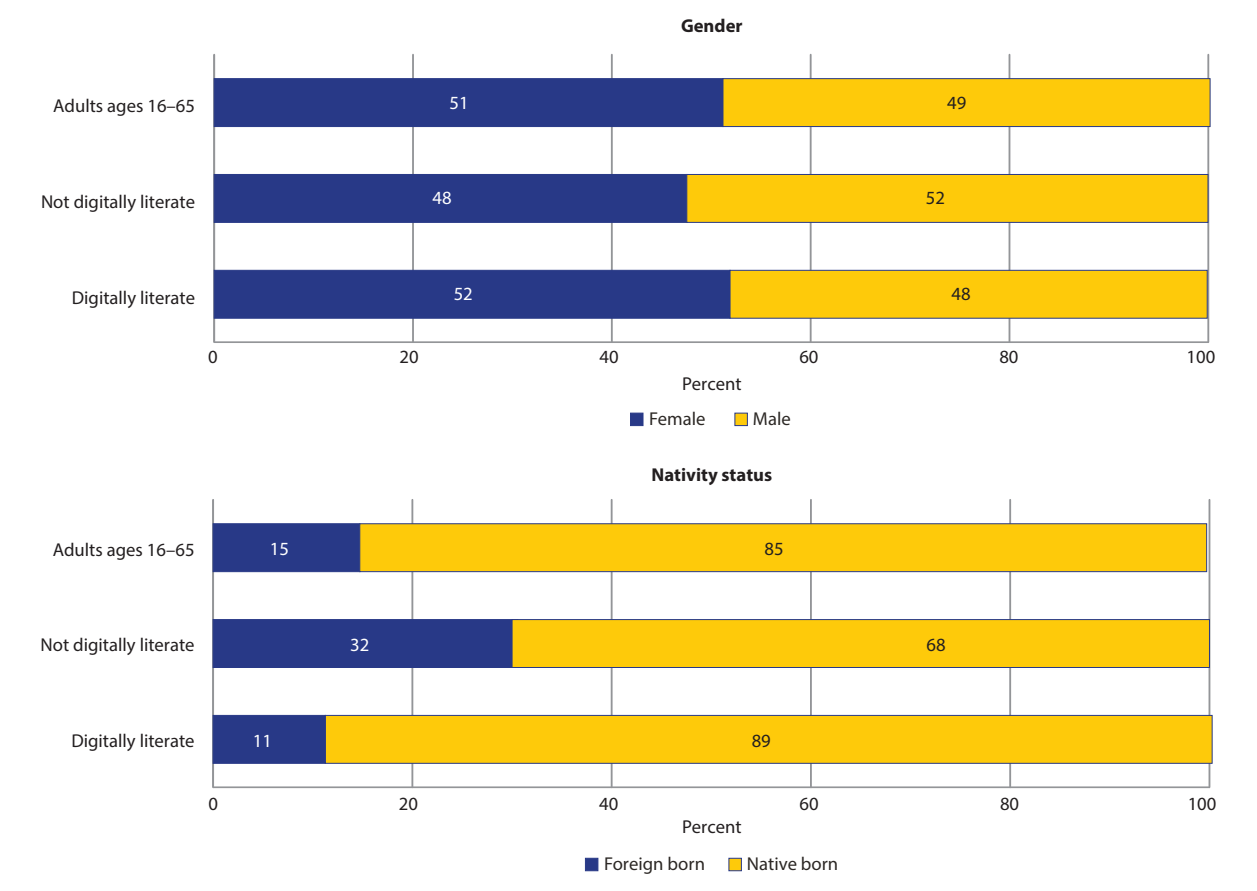


SOURCE: U.S. Department of Education, National Center for Education Statistics, Organization for Economic Cooperation and Development (OECD), Program for the International Assessment of Adult Competencies (PIAAC), 2012.

[6] The average age of adults who were not digitally literate was 46.3, with a standard error of 0.54. The average age of adults who were digitally literate was 38.7, with a standard error of 0.14.

FIGURE 5.

DISTRIBUTIONS OF GENDER AND NATIVITY
Percentage distributions of gender and nativity status among U.S. adults ages 16–65, by digital literacy status: 2012



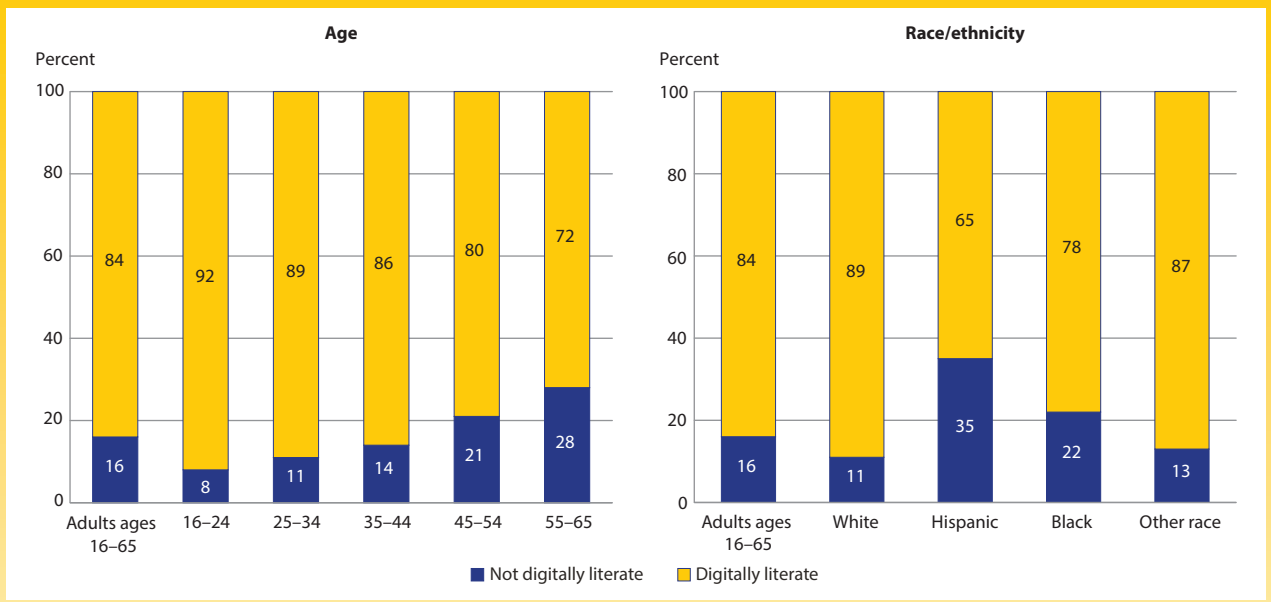
SOURCE: U.S. Department of Education, National Center for Education Statistics, Organization for Economic Cooperation and Development (OECD), Program for the International Assessment of Adult Competencies (PIAAC), 2012.

Race/ethnicity. The percentage of Black adults who are not digitally literate is about twice the percentage of White adults (22 versus 11 percent) (figure 6), and the percentage of Hispanic adults who are not digitally literate is about three times the percentage of White adults (35 versus 11 percent). Nonetheless, White adults make up about half (46 percent) of adults who are not digitally literate (figure 7).

Labor force experience. In this Brief, adults are classified according to their labor force status as employed, unemployed (not working and looking for work), and "not in the labor force" (not working and not looking for work). In addition, adults' labor force experiences are examined using labor force participation rate, employment rate, and occupation skill level. The labor force participation rate is the percentage of adults who are in the labor force—that is, either employed or not employed but looking for work (unemployed). The employment rate is the percentage of adults in the labor force who are employed. Occupation skill level is based on an OECD measure that classifies occupations into four broad skill levels: (1) skilled occupations (e.g., legislators, senior officials and managers, professionals, technicians, and associate professionals), (2) semiskilled white-collar occupations (e.g., clerks, service workers, and shop and market sales workers),

FIGURE 6.

DIGITAL LITERACY BY AGE AND RACE/ETHNICITY
Rate of digital literacy among U.S. adults ages 16–65, by age and by race/ethnicity: 2012



NOTE: *Other race* includes Asian, American Indian or Alaska Native, Hawaiian or other Pacific Islander, and persons of Two or more races. Race categories exclude persons of Hispanic ethnicity. Detail may not sum to 100 because of rounding.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Organization for Economic Cooperation and Development (OECD), Program for the International Assessment of Adult Competencies (PIAAC), 2012.

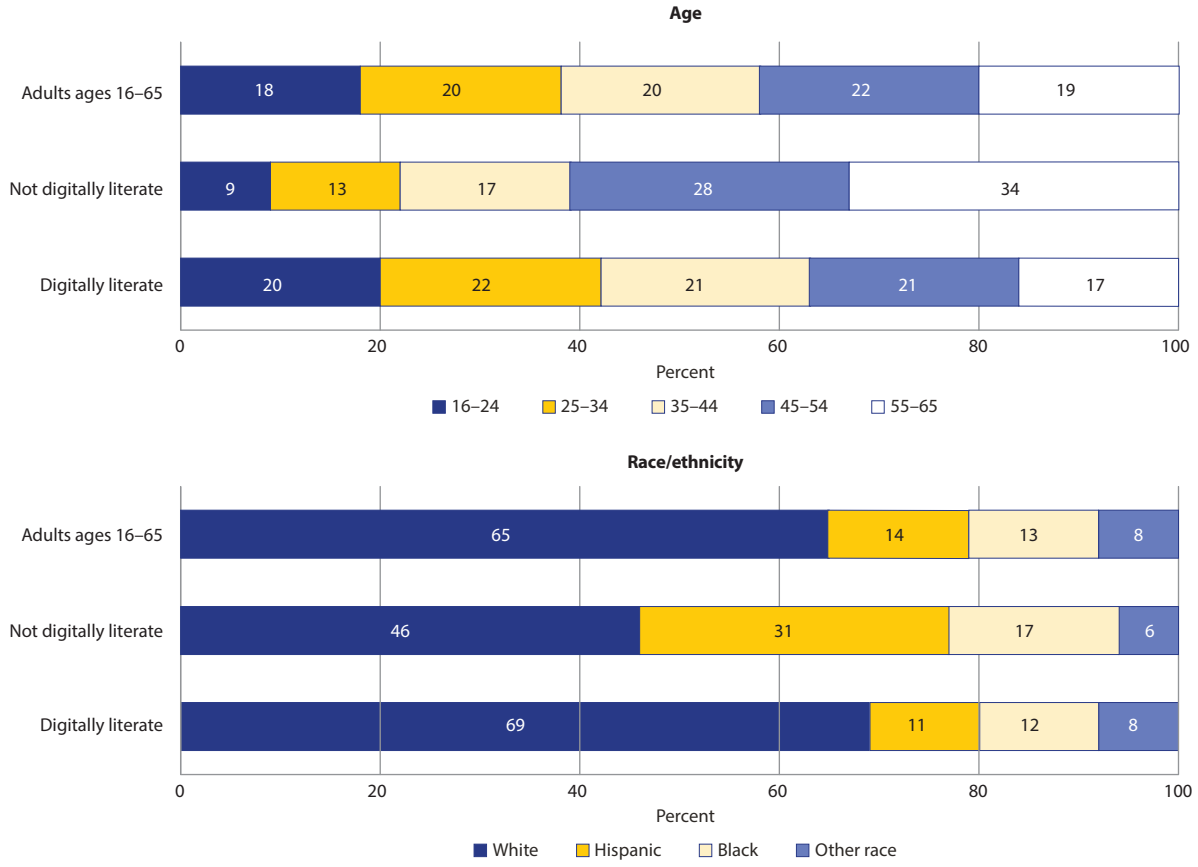
(3) semiskilled blue-collar occupations (e.g., skilled agricultural and fishery workers, craft and related trades workers, and plant and machine operators and assemblers), and (4) unskilled occupations (e.g., laborers) (OECD 2013).

The rate of digital nonliteracy is not measurably different among employed (13 percent) and unemployed adults (14 percent), but is higher for adults who are not in the labor force (30 percent) (figure 8). Likewise, digitally literate adults have a higher rate of labor force participation than do adults who are not digitally literate (84 percent and 66 percent, respectively, figure 9). And among adults who participate in the labor force, both digitally literate and nonliterate adults have employment rates of 90 percent.

In addition, digitally literate and nonliterate adults tend to work in different types of jobs. Generally, as the skill level of a job decreases, the proportion of adults who are not digitally literate increases (figure 10). Thus, compared to digitally literate adults, adults who are not digitally literate are more often found in unskilled or semiskilled blue-collar jobs (figure 11). For example, 22 percent of adults who are not digitally literate work in unskilled occupations, compared to 7 percent of digitally literate adults. However, adults who are not digitally literate are more often found in semiskilled occupations than in skilled or unskilled occupations.

FIGURE 7.

DISTRIBUTIONS OF AGE AND RACE/ETHNICITY
Percentage distributions of age and race/ethnicity among U.S. adults ages 16–65, by digital literacy status: 2012

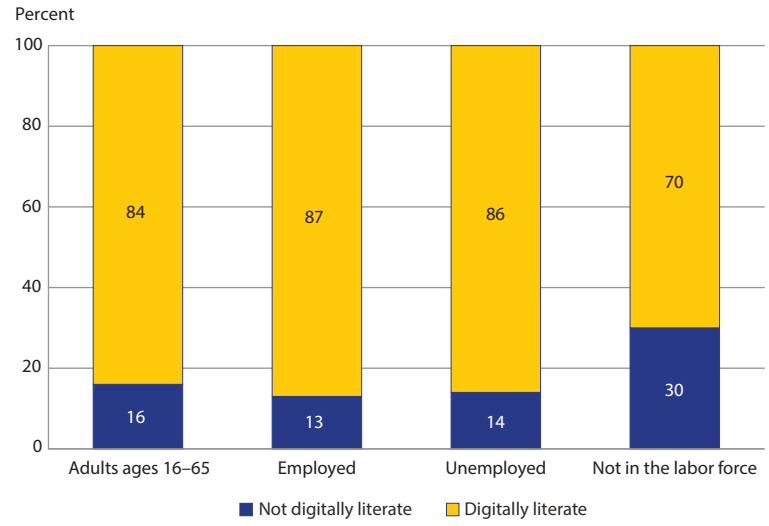


NOTE: *Other race* includes Asian, American Indian or Alaska Native, Hawaiian or other Pacific Islander, and persons of Two or more races. Race categories exclude persons of Hispanic ethnicity. Detail may not sum to 100 because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Organization for Economic Cooperation and Development (OECD), Program for the International Assessment of Adult Competencies (PIAAC), 2012.

FIGURE 8.

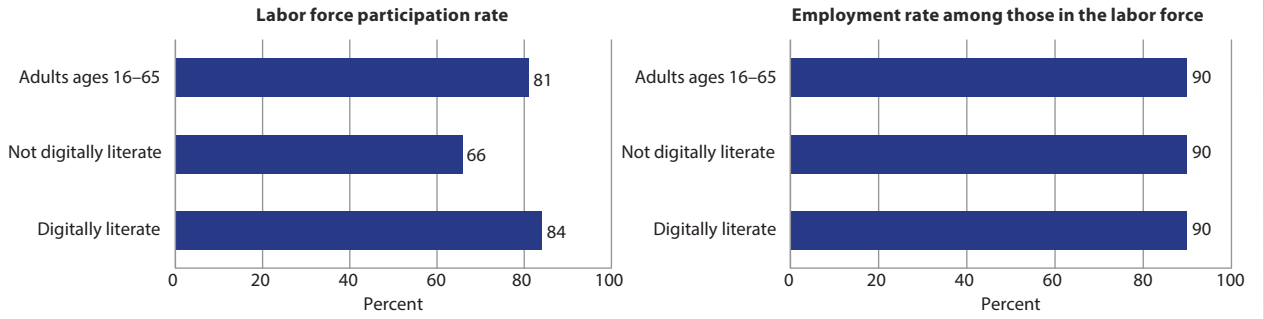
DIGITAL LITERACY BY EMPLOYMENT AND LABOR FORCE STATUS
Rate of digital literacy among U.S. adults ages 16–65, by employment and labor force status: 2012



SOURCE: U.S. Department of Education, National Center for Education Statistics, Organization for Economic Cooperation and Development (OECD), Program for the International Assessment of Adult Competencies (PIAAC), 2012.

FIGURE 9.

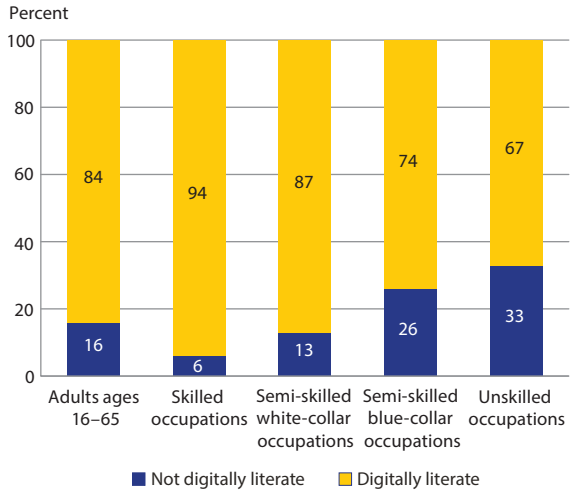
RATES OF LABOR FORCE PARTICIPATION AND EMPLOYMENT
Labor force participation rate and employment rate among U.S. adults ages 16–65, by digital literacy status: 2012



NOTE: The labor force participation rate is the percentage of adults who are in the labor force—that is, either employed or not employed but looking for work (unemployed). The employment rate is the percentage of adults in the labor force who are employed.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Organization for Economic Cooperation and Development (OECD), Program for the International Assessment of Adult Competencies (PIAAC), 2012.

FIGURE 10.

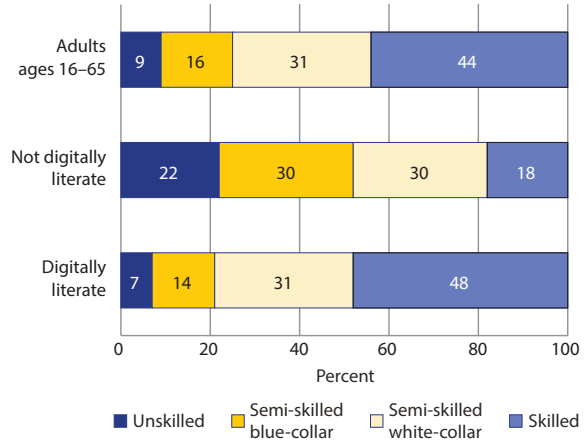
DIGITAL LITERACY BY OCCUPATION SKILL-LEVEL
Rate of digital literacy among U.S. workers ages 16–65, by occupation skill-level: 2012



NOTE: Estimates for occupation skill-levels are based on adults ages 16–65 who worked in the last 12 months. Occupation skill-level is based on an OECD measure that classifies occupations into four broad skill-levels: (1) skilled occupations (e.g. legislators, senior officials and managers, professionals, technicians and associate professionals); (2) semi-skilled white-collar occupations (e.g. clerks, service workers, and shop and market sales workers); (3) semi-skilled blue-collar occupations (e.g. skilled agricultural and fishery workers, craft and related trades workers, plant and machine operators and assemblers); and (4) unskilled occupations (e.g. laborers) (OECD 2013).
SOURCE: U.S. Department of Education, National Center for Education Statistics, Organization for Economic Cooperation and Development (OECD), Program for the International Assessment of Adult Competencies (PIAAC), 2012.

FIGURE 11.

DISTRIBUTION OF OCCUPATION SKILL-LEVEL
Percentage distribution of occupation skill-level of U.S. workers ages 16–65, by digital literacy status: 2012



NOTE: Estimates for occupation skill-levels are based on adults ages 16–65 who worked in the last 12 months. Occupation skill-level is based on an OECD measure that classifies occupations into four broad skill-levels: (1) skilled occupations (e.g. legislators, senior officials and managers, professionals, technicians and associate professionals); (2) semi-skilled white-collar occupations (e.g. clerks, service workers, and shop and market sales workers); (3) semi-skilled blue-collar occupations (e.g. skilled agricultural and fishery workers, craft and related trades workers, plant and machine operators and assemblers); and (4) unskilled occupations (e.g. laborers) (OECD 2013).
SOURCE: U.S. Department of Education, National Center for Education Statistics, Organization for Economic Cooperation and Development (OECD), Program for the International Assessment of Adult Competencies (PIAAC), 2012.

2 How does the United States compare to other developed countries on digital literacy?

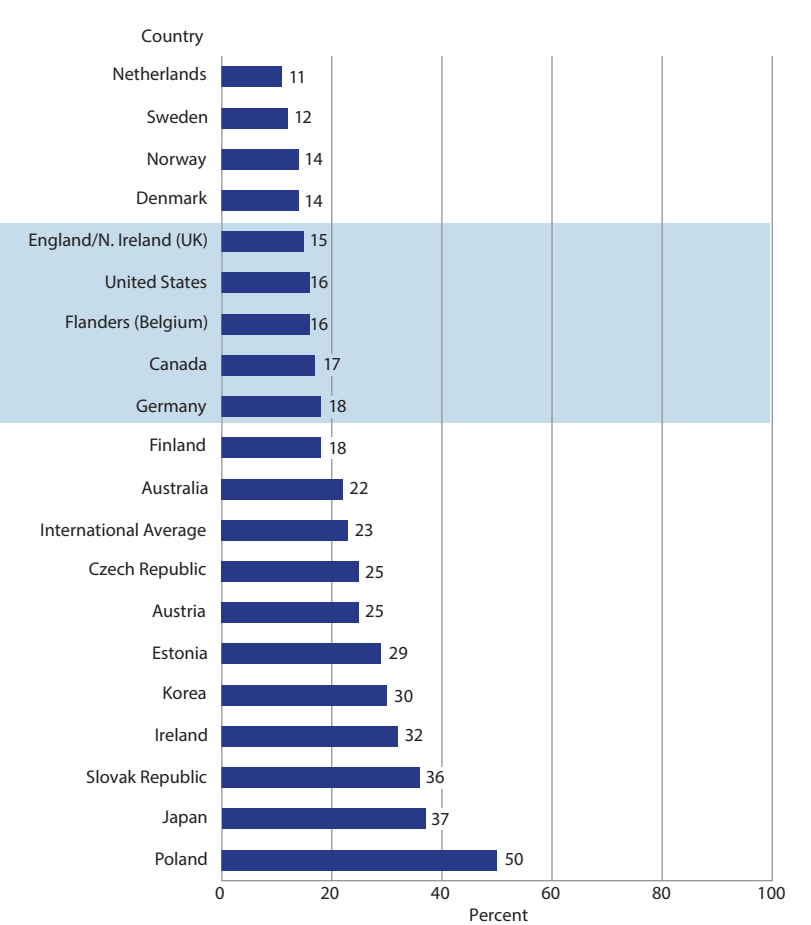
The rate of digital literacy among adults ages 16–65 is higher in the United States than the average of the 19 participating PIAAC countries. About 84 percent of U.S. adults are digitally literate compared to the international average of 77 percent. Conversely, 16 percent of U.S. adults are not digitally literate compared to the international average of 23 percent (figure 12).

The proportion of U.S. adults who are not digitally literate is not measurably different from the proportions in England/Northern Ireland (UK), Flanders (Belgium), Canada, and Germany. The Netherlands and several Nordic countries[7] (Sweden, Norway, and Denmark) have the smallest proportions of adults who are not digitally literate.[8] In contrast, the Slovak Republic, Japan, and Poland have the highest proportions of adults who are not digitally literate.

Although the United States has a relatively high proportion of adults who are digitally literate, those digitally literate adults scored relatively low on the PIAAC digital problem-solving assessment. U.S. adults had an average score of 277 on that assessment, compared to the international average of 283; overall, 14 of the 19 participating countries scored measurably higher than the United States (Goodman et al. 2013).[9] More information about performance on the digital problem-solving assessment is available in Goodman et al. (2013), Reder (2015), and OECD (2013).

FIGURE 12.

DIGITAL LITERACY BY COUNTRY
Percentage of adults ages 16–65 who are not digitally literate, by country: 2012



NOTE: Countries are listed in descending order based on unrounded percentage estimates. Shaded countries have a percentage estimate that is not measurably different from that of the United States.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Organization for Economic Cooperation and Development (OECD), Program for the International Assessment of Adult Competencies (PIAAC), 2012.

[7] The Nordic countries that participated in PIAAC are Denmark, Finland, Norway, and Sweden. (Iceland is the one Nordic country that did not participate.)

[8] There are two exceptions: The percentages of adults who are not digitally literate in Denmark and Norway are not measurably different from those of England/Northern Ireland.

[9] Scores ranged from 0 to 500; see exhibit 2.

3 How does the United States compare to other developed countries on computer use at work and in everyday life?

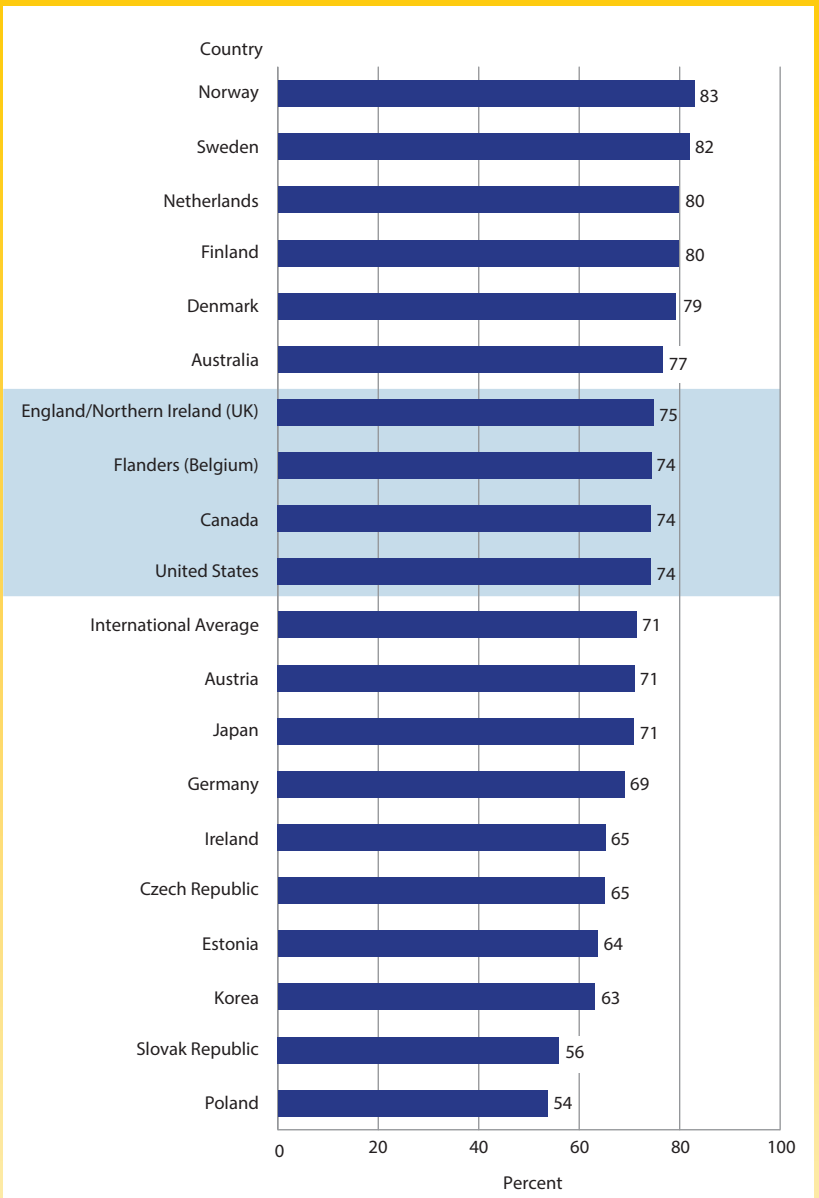
The PIAAC background questionnaire that was administered along with the PIAAC assessment asked working adults if they use a computer at work and also asked all adults if they use a computer in everyday life outside of work. The prevalence of digital technologies is evident in the rates of reported computer usage both at work and in everyday life. Internationally, 71 percent of workers in the 19 participating OECD countries use a computer at work, and 83 percent of adults use a computer in everyday life (figures 13 and 14).

A larger portion of U.S. workers use computers at work compared to workers internationally, but a smaller proportion of U.S. adults use computers in everyday life compared to adults internationally. Some 74 percent of U.S. workers use computers at work, 3 percentage points higher than the international average. Meanwhile, 81 percent of U.S. adults use computers in everyday life, 3 percentage points lower than the international average (based on unrounded estimates).

Poland, Ireland, Korea, the Czech Republic, and the Slovak Republic have some of the smallest proportions of adults using computers at work and in everyday life; these countries also have some of the largest proportions of adults who are not digitally literate.

FIGURE 13.

COMPUTER USE AT WORK, BY COUNTRY
Percentage of working adults ages 16–65 who use computers at work, by country: 2012



NOTE: Estimates are based on adults who worked in the last 12 months. Countries are listed in descending order based on unrounded percentage estimates. Shaded countries have a percentage estimate that is not measurably different from that of the United States.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Organization for Economic Cooperation and Development (OECD), Program for the International Assessment of Adult Competencies (PIAAC), 2012.

Finland, Sweden, Denmark, Norway, and the Netherlands have the largest proportions of adults using computers at work and in everyday life; with the exception of Finland, these countries have the smallest proportions of adults who are not digitally literate.[10,11]

FIGURE 14.

COMPUTER USE IN EVERYDAY LIFE, BY COUNTRY
Percentage of adults ages 16–65 who use computers in everyday life, by country: 2012

NOTE: Countries are listed in descending order based on unrounded percentage estimates. Shaded countries have a percentage estimate that is not measurably different from that of the United States.
SOURCE: U.S. Department of Education, National Center for Education Statistics, Organization for Economic Cooperation and Development (OECD), Program for the International Assessment of Adult Competencies (PIAAC), 2012.

[10] Finland's proportion of adults who are not digitally literate is below the international average, but is still larger than the proportion in eight other countries.

[11] Although digital literacy and computer usage are related concepts, they are not exactly the same. For example, someone could currently not use a computer, but still have the ability to use one, based on past experience. Or persons could report that they do use a computer, but might use it in such a rudimentary manner that they are essentially not digitally literate.

FIND OUT MORE

For questions about content, to download this Statistics in Brief, or view this report online, go to:

http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2018161

To access and explore PIAAC data, visit the PIAAC International Data Explorer at:
http://nces.ed.gov/surveys/international/ide/

In addition, the PIAAC Gateway provides a clearinghouse of PIAAC news and analyses:
http://piaacgateway.com

TECHNICAL NOTES

This section describes the assessment design, sampling and weighting, and statistical testing procedures used for the 2012 Program for the International Assessment of Adult Competencies (PIAAC). The PIAAC was a household data collection, conducted from August 2011 through April 2012, in 24 countries including the United States. In the United States, PIAAC was collected under the auspices of the National Center for Education Statistics (NCES).

The PIAAC collection included a detailed background questionnaire, administered as a computer-assisted personal interview, and an assessment covering four competency domains: literacy, numeracy, reading components, and problem solving in technology-rich environments. The assessment was administered via computer, whenever the respondent was able and willing to do so; otherwise, a paper-and-pencil assessment was used for the literacy, numeracy, and reading components domains, and the "problem solving in technology rich environments" domain was not assessed.

The "problem solving in technology-rich environments" competency domain is most relevant to this Statistics in Brief (where it was previously referred to as "digital problem solving"), and is described below.

Problem Solving in Technology-Rich Environments

PIAAC's problem solving in technology-rich environments (PS-TRE) assessment is an innovative addition to adult literacy and large-scale assessments—an addition that reflects the recent growth in digital technologies that has revolutionized access to information. In the PIAAC PS-TRE framework, PS-TRE is defined as "using digital technology, communication tools, and networks to acquire and evaluate information, communicate with others, and perform practical tasks" (OECD 2012). Specifically, PS-TRE assesses the cognitive processes of problem solving—goal setting, planning, selecting, evaluating, organizing, and communicating results—within the digital environment.

PS-TRE items present tasks of varying difficulty to be performed in simulated software applications using commands and functions commonly found in the digital environments of e-mail, web pages, and spreadsheets. These tasks range from purchasing particular goods or services online and finding interactive health information to managing personal information and business finances. Descriptions of PS-TRE tasks that are associated with PIAAC scores and achievement levels are noted in exhibit 2, and examples of PS-TRE items are available online at http://nces.ed.gov/surveys/piaac/sample-pstre.asp and in exhibit B-6 of Goodman et al. (2013).

As seen in exhibit 2, three groups of adults were excluded from the PS-TRE competency domain because of their lack of computer skill. These three groups—adults who reported no computer experience, who failed the basic computer test, or who opted out of taking the computer-based assessment—are defined in this Statistics in Brief as "not digitally literate." As previously mentioned, 16 percent of the U.S. sample fell into this not-digitally-literate category.

More information on the 2012 PIAAC is available in the U.S. PIAAC technical report (Hogan et al. 2014), in Goodman et al. (2013), and at http://nces.ed.gov/surveys/piaac/admin.asp.

United States Sampling

As in all PIAAC participating countries, the target population for the 2012 PIAAC assessment in the United States was adults ages 16 to 65, living in households, with a country sample size goal of 5,000 adults. The U.S. sample started with a nationally representative probability sample of 9,468 households. This household sample was selected on the basis of a four-stage, stratified area sample: (1) primary sampling units consisting of counties or groups of contiguous counties, (2) secondary sampling units consisting of area blocks, (3) housing units containing households, and (4) eligible persons within households (up to two adults per household could be selected). Person-level data were collected through a screener, a background questionnaire, and

the assessment. The screener instrument was administered first, using a computer-assisted personal interviewing system. The screener collected basic demographic information on all household members; it was used to determine household members' eligibility for the study and to select the sample person(s). Of the 9,468 sampled households, 1,285 were either vacant or not a dwelling unit, resulting in a sample of 8,183 eligible households. In the sample of eligible households, 1,267 households did not have an eligible adult ages 16 to 65. A total of 5,686 of the 6,916 households with eligible adults completed the screener. The weighted screener response rate was 86.5 percent.

At the screener stage, 6,100 adults ages 16 to 65 were selected to complete the next stage, the PIAAC background questionnaire; a total of 4,898 adults actually completed the background questionnaire. Of the 1,202 respondents who did not complete the background questionnaire, 112 were unable to do so because of a literacy-related barrier—either the inability to communicate in English or Spanish (the two languages in which the background questionnaire was administered) or a mental disability. Twenty others were unable to complete the questionnaire due to technical problems. The final weighted response rate for the background questionnaire—which included adults who completed it and adults who were unable to complete it because of a language problem or mental disability—was 82.2 percent.

Of the 4,898 adults who completed the background questionnaire, 4,820 completed the assessment. An additional 22 were unable to complete the assessment for literacy-related reasons. Another 11 were unable to do so due to technical problems. The weighted response rate for the overall assessment—which included adults who answered at least one question in each domain and the 22 adults who were unable to do so because of a language problem, mental disability, or technical problem—was 99.0 percent. The overall weighted response rate for the U.S. PIAAC sample, which is the product of response rates on the screener (86.5 percent), background questionnaire (82.2 percent), and assessment (99.0 percent), was 70.3 percent.

For adults who did not complete any tasks in any of the assessment domains, no information is available about their performance. Omitting these individuals from the data would have resulted in unknown biases in estimates of the cognitive skills of the national population because refusals cannot be assumed to have occurred randomly. Thus, for adults who answered the background questionnaire but refused to complete the assessment for reasons that were not literacy related (that is, for reasons other than language issues or a mental disability), proficiency values were imputed based on the covariance information from those who completed the assessment.

The final PIAAC reporting sample (those with a final weight for analysis, including the imputed cases) consisted of 5,010 respondents. These 5,010 respondents are the 4,898 respondents who completed the background questionnaire, plus the 112 respondents who were unable to complete the background questionnaire for literacy-related reasons.

The PIAAC sample was subject to unit nonresponse from the screener, background questionnaire, and assessment. Although the screener and assessment had unit response rates above 85 percent, the background questionnaire had a unit response rate below 85 percent and thus, based on NCES statistical standards, required an analysis of the potential for nonresponse bias.

Nonresponse Bias

A nonresponse bias analysis of respondents to the background questionnaire revealed differences in the characteristics of respondents compared with those who did not respond. The following variables were identified as those that contributed most to differential response rates: education level, gender, age, race/ethnicity, employment status, household size, whether children under 16 live in the household, whether the house is owner occupied, and region of the country. Weighting adjustments were applied to adjust for these

EXHIBIT 2.

PIAAC proficiency levels for problem solving in technology-rich environments (PS-TRE) and groups that did not participate in the PS-TRE competency domain

Achievement level and PS-TRE score range	Task descriptions
No computer experience No PS-TRE score	Adults in this category reported having no prior computer experience; therefore, they did not take part in the computer-based assessment but took the paper-based version of the assessment, which does not include the problem solving in technology-rich environments domain.
Failed basic computer test (information and communication technology [ICT] core) No PS-TRE score	Adults in this category had prior computer experience but failed the ICT core test, which assesses basic computer skills, such as the ability to use a mouse or scroll through a web page, needed to take the computer-based assessment. Therefore, they did not take part in the computer-based assessment, but took the paper-based version of the assessment, which does not include the problem solving in technology-rich environments domain.
"Opted out" of taking computer-based assessment No PS-TRE score	Adults in this category opted to take the paper-based assessment without first taking the ICT core assessment, even if they reported some prior experience with computers. They also did not take part in the computer-based assessment, but took the paper-based version of the assessment, which does not include the problem solving in technology-rich environments domain.
Below Level 1 Score of 0–240	At this level, tasks are based on well-defined problems involving the use of only one function within a generic interface to meet one explicit criterion without any categorical or inferential reasoning or transforming of information. Few steps are required and no subgoal has to be generated.
Level 1 Score of 241–290	At this level, tasks typically require the use of widely available and familiar technology applications, such as e-mail software or a web browser. There is little or no navigation required to access the information or commands required to solve the problem. The problem may be solved regardless of the respondent's awareness and use of specific tools and functions (e.g., a sort function). The tasks involve few steps and a minimal number of operators. At the cognitive level, the respondent can readily infer the goal from the task statement; problem resolution requires the respondent to apply explicit criteria, and there are few monitoring demands (e.g., the respondent does not have to check whether he or she has used the appropriate procedure or made progress toward the solution). Identifying content and operators can be done through a simple match. Only simple forms of reasoning, such as assigning items to categories, are required; there is no need to contrast or integrate information.
Level 2 Score of 291–340	At this level, tasks typically require the use of both generic and more specific technology applications. For instance, the respondent may have to use a novel online form. Some navigation across pages and applications is required to solve the problem. The use of tools (e.g., a sort function) can facilitate the resolution of the problem. The task may involve multiple steps and operators. The goal of the problem may have to be defined by the respondent, though the criteria to be met are explicit. There are higher monitoring demands. Some unexpected outcomes or impasses may appear. The task may require evaluating the relevance of a set of items in order to discard distractors. Some integration and inferential reasoning may be needed.
Level 3 Score of 341–500	At this level, tasks typically require the use of both generic and more specific technology applications. Some navigation across pages and applications is required to solve the problem. The use of tools (e.g., a sort function) is required to make progress toward the solution. The task may involve multiple steps and operators. The goal of the problem may have to be defined by the respondent, and the criteria to be met may or may not be explicit. There are typically high monitoring demands. Unexpected outcomes and impasses are likely to occur. The task may require evaluating the relevance and reliability of information in order to discard distractors. Integration and inferential reasoning may be needed to a large extent.

NOTE: Information about the procedures used to set the achievement levels is available in PIAAC Technical Standards and Guidelines (OECD 2014).
SOURCE: Organization for Economic Cooperation and Development (OECD), 2013. OECD Skills Outlook 2013: First Results From the Survey of Adult Skills, table 2.4.

response rate differences and were found to be highly effective in reducing nonresponse bias. The potential nonresponse bias attributable to unit nonresponse on the background questionnaire, after adjustment, was negligible.

Weighting and Variance Estimation

The PIAAC sample was selected using a complex sample design. Sampling weights were used to account for the fact that in a complex sampling design the probabilities of selection are not identical for all respondents. The sampling weights were further adjusted for nonresponse to the screener and background questionnaire, extreme weights were trimmed, and weights for all respondents were calibrated to the U.S. Census Bureau's 2010 American Community Survey population totals for those ages 16 to 65.

Because the statistics presented in this report are estimates based on a sample of respondents, it is important to have measures of the degree of uncertainty of the estimates. Accordingly, in addition to providing estimates of percentages, this Brief provides information about the uncertainty of each statistic in the form of standard errors (see appendix A). Because PIAAC used clustered sampling, conventional formulas for estimating standard errors (which assume simple random sampling and hence independence of observations) are inappropriate. For this reason, the PIAAC uses a paired jackknife replication approach (Rust and Rao 1996) to estimate standard errors.

Statistical Testing

The statistical comparisons in this report were based on the *t* statistic. Statistical significance was determined by calculating a *t* value for the difference between a pair of means or proportions and comparing this value with published tables of values at a certain level of significance, called the alpha level. The alpha level is an a priori statement of the probability of inferring that a difference exists when, in fact, it does not. In this Brief, findings from *t* tests are reported based on a statistical significance (or alpha level) set at .05. Student's *t* values were computed to test differences between independent estimates using the following formula:

$$t = \frac{E_1 - E_2}{\sqrt{se_1^2 + se_2^2}}$$

where E_1 and E_2 are the estimates to be compared and se_1 and se_2 are their corresponding standard errors. In instances where comparisons were made on dependent samples, the test statistic calculation was adjusted for the shared variance in the dependent groups. No adjustments were made for multiple comparisons.

There are some potential hazards in interpreting the results of statistical tests. First, the magnitude of the *t* statistic depends not only on observed differences between means or percentages but also on the number of respondents. A small difference found in a comparison across a large number of respondents would still produce a large and possibly statistically significant *t* statistic.

A second hazard stems from reliance on a sample, rather than an entire population: one can conclude that a difference found in the sample is real when there is no true difference in the population. Statistical tests are designed to limit the risk of this Type 1, or "false positive," error by setting a significance level, or alpha. The alpha level of .05 used in this report ensures that the probability of finding a false positive result is no more than 1 in 20 (.05) occurrences. However, failing to meet the significance level of .05 does not mean that there is no real difference between two quantities, only that the likelihood is less.

It is important to note that many of the variables examined in this report may be related to one another and to other variables not included in the analysis. The complex interactions and relationships among the variables were not explored. Furthermore, the variables examined in this report are just a few of those that could be examined. Thus, readers are cautioned not to draw causal inferences based on the results presented here.

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APPENDIX A: DATA TABLES

Table A-1. Percentage distribution of digital literacy status among U.S. adults ages 16 to 65, by demographic characteristic: 2012

		Not digitally literate				Digitally literate[1]		
	Total, all adults	Total	No computer experience	Failed basic computer test	Opted out of computer-based assessment	Total	Level 1 or below	Level 2 or 3
All adults	**100.0**	**16.3**	**5.5**	**4.2**	**6.6**	**83.7**	**51.1**	**32.6**
Educational attainment								
Less than high school	100.0	41.1	21.5	7.7	11.9	58.9	45.3	13.6
High school diploma	100.0	17.2	4.1	5.0	8.2	82.8	58.0	24.7
Associate's or higher degree	100.0	4.7	0.8	1.7	2.2	95.3	43.8	51.4
Gender								
Male	100.0	17.6	6.1	4.9	6.6	82.5	48.0	34.4
Female	100.0	15.2	4.9	3.7	6.6	84.8	54.1	30.8
Nativity status								
Born in U.S.	100.0	12.9	3.5	3.3	6.2	87.1	51.5	35.6
Born outside of U.S.	100.0	35.9	17.1	9.8	9.1	64.1	48.9	15.2
Age								
16–24	100.0	7.7	0.9 !	3.7	3.1	92.3	52.4	39.9
25–34	100.0	10.7	2.0 !	3.8	4.9	89.3	48.9	40.4
35–44	100.0	13.8	5.1	3.5	5.2	86.2	50.1	36.0
45–54	100.0	20.5	7.8	5.4	7.3	79.5	53.0	26.6
55–65	100.0	28.4	11.2	4.7	12.5	71.7	51.1	20.5
Race/ethnicity[2]								
White	100.0	11.5	2.8	2.6	6.1	88.6	48.4	40.1
Black	100.0	22.4	6.6	7.8	8.0	77.6	64.4	13.2
Hispanic	100.0	35.0	17.8	8.7	8.6	65.0	50.2	14.7
Other race	100.0	13.2	3.7 !	4.5	5.0	86.8	54.2	32.6

! Interpret data with caution. The coefficient of variation (CV) for this estimate is between 30 and 50 percent.

[1] See exhibit 2 for definitions of digital literacy levels.

[2] Other race includes Asian, American Indian or Alaska Native, Hawaiian or other Pacific Islander, and persons of Two or more races. Race categories exclude persons of Hispanic ethnicity.

NOTE: Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Organization for Economic Cooperation and Development (OECD), Program for the International Assessment of Adult Competencies (PIAAC), 2012.

Table A-2. Percentage distribution of each demographic characteristic among U.S. adults ages 16 to 65, by digital literacy status: 2012

Characteristic	Total, all adults	Not digitally literate				Digitally literate[1]		
		Total	No computer experience	Failed basic computer test	Opted out of computer-based assessment	Total	Level 1 or below	Level 2 or 3
Educational attainment								
Less than high school	**14.8**	37.1	57.8	26.9	26.5	10.4	13.1	6.2
High school diploma	**49.8**	52.6	37.1	58.7	61.5	49.2	56.5	37.8
Associate's or higher degree	**35.5**	10.3	5.1	14.4	11.9	40.4	30.4	56.0
Gender								
Male	**48.8**	52.5	54.2	56.0	48.7	48.1	45.9	51.7
Female	**51.2**	47.5	45.8	44.0	51.3	51.9	54.2	48.4
Nativity								
Native-born	**85.3**	67.6	54.2	66.0	79.8	88.7	85.9	93.1
Foreign-born	**14.7**	32.4	45.8	34.0	20.2	11.3	14.1	6.9
Age								
16–24	**18.4**	8.7	2.9 !	15.9	8.7	20.3	18.8	22.5
25–34	**20.4**	13.3	7.5 !	18.3	15.0	21.8	19.5	25.3
35–44	**20.0**	16.9	18.7	16.4	15.7	20.5	19.6	22.1
45–54	**22.0**	27.6	31.4	28.2	24.1	20.9	22.8	17.9
55–65	**19.3**	33.5	39.5	21.2	36.5	16.6	19.3	12.2
Race/ethnicity[2]								
White	**65.5**	45.9	33.4	39.5	60.4	69.3	62.0	80.8
Black	**12.7**	17.4	15.2	23.3	15.3	11.7	15.9	5.1
Hispanic	**14.2**	30.5	46.2	29.1	18.5	11.1	14.0	6.5
Other race	**7.7**	6.2	5.2 !	8.1	5.8	8.0	8.1	7.7

! Interpret data with caution. The coefficient of variation (CV) for this estimate is between 30 and 50 percent.

[1] See exhibit 2 for definitions of digital literacy levels.

[2] Other race includes Asian, American Indian or Alaska Native, Hawaiian or other Pacific Islander, and persons of Two or more races. Race categories exclude persons of Hispanic ethnicity.

NOTE: Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Organization for Economic Cooperation and Development (OECD), Program for the International Assessment of Adult Competencies (PIAAC), 2012.

Table A-3. Percentage distribution of digital literacy status among U.S. adults ages 16 to 65, by employment characteristic: 2012

Characteristic	Total, all adults	Not digitally literate				Digitally literate[1]		
		Total	No computer experience	Failed basic computer test	Opted out of computer-based assessment	Total	Level 1 or below	Level 2 or 3
All adults	**100.0**	**16.3**	**5.5**	**4.2**	**6.6**	**83.7**	**51.1**	**32.6**
Employment and labor force status								
Employed	**100.0**	13.1	4.1	3.6	5.4	86.9	51.5	35.4
Unemployed	**100.0**	13.6	1.6	4.4	7.6	86.4	58.5	27.9
Not in the labor force	**100.0**	29.9	12.4	6.4	11.1	70.1	46.5	23.6
Occupation skill level (among the employed)[2]								
Skilled occupations	**100.0**	5.8	0.6 !	1.9	3.4	94.2	46.2	48.0
Semi-skilled white-collar occupations	**100.0**	13.5	3.0	4.7	5.8	86.5	57.4	29.2
Semi-skilled blue-collar occupations	**100.0**	26.3	10.7	6.2	9.4	73.7	56.5	17.2
Unskilled occupations	**100.0**	32.9	13.6	7.9	11.4	67.1	50.3	16.8

! Interpret data with caution. The coefficient of variation (CV) for this estimate is between 30 and 50 percent.

[1] See exhibit 2 for definitions of digital literacy levels.

[2] Occupation skill level classifies occupations into four broad levels: (1) skilled occupations (e.g. legislators, senior officials and managers, professionals, technicians and associate professionals); (2) semi-skilled white-collar occupations (e.g. clerks, service workers, and shop and market sales workers); (3) semi-skilled blue-collar occupations (e.g. skilled agricultural and fishery workers, craft and related trades workers, plant and machine operators and assemblers); and (4) unskilled occupations (e.g. laborers).

NOTE:. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Organization for Economic Cooperation and Development (OECD), Program for the International Assessment of Adult Competencies (PIAAC), 2012.

Table A-4. Percentage distribution of each employment characteristic among U.S. adults ages 16 to 65, by digital literacy status: 2012

Characteristic	Total, all adults	Not digitally literate				Digitally literate[1]		
		Total	No computer experience	Failed basic computer test	Opted out of computer-based assessment	Total	Level 1 or below	Level 2 or 3
Labor force status								
In the labor force	**81.3**	65.7	57.6	71.5	68.7	84.3	83.0	86.4
Not in the labor force	**18.7**	34.3	42.4	28.6	31.3	15.7	17.0	13.6
Employment status (among those in the labor force)								
Employed	**90.3**	89.9	95.9	88.5	86.7	90.3	89.1	92.2
Unemployed	**9.8**	10.1	4.1 !	11.5	13.3	9.7	10.9	7.9
Occupation (among the employed)[2]								
Skilled occupations	**43.7**	18.2	5.8 !	20.4	25.4	47.9	39.1	61.1
Semi-skilled white-collar occupations	**31.1**	30.1	22.8	36.4	30.9	31.3	34.5	26.4
Semi-skilled blue-collar occupations	**16.0**	30.2	41.4	25.0	25.8	13.7	17.5	8.0
Unskilled occupations	**9.2**	21.6	30.0	18.2	17.9	7.1	8.9	4.5

! Interpret data with caution. The coefficient of variation (CV) for this estimate is between 30 and 50 percent.

[1] See exhibit 2 for definitions of digital literacy levels.

[2] Occupation skill level classifies occupations into four broad levels: (1) skilled occupations (e.g. legislators, senior officials and managers, professionals, technicians and associate professionals); (2) semi-skilled white-collar occupations (e.g. clerks, service workers, and shop and market sales workers); (3) semi-skilled blue-collar occupations (e.g. skilled agricultural and fishery workers, craft and related trades workers, plant and machine operators and assemblers); and (4) unskilled occupations (e.g. laborers).

NOTE:. Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Organization for Economic Cooperation and Development (OECD), Program for the International Assessment of Adult Competencies (PIAAC), 2012.

Table A-5. Percentage distribution of digital literacy status among adults ages 16 to 65, by country: 2012

Country	Total, all adults	Not digitally literate				Digitally literate[1]		
		Total	No computer experience	Failed basic computer test	Opted out of computer-based assessment	Total	Level 1 or below	Level 2 or 3
International Average	**100.0**	**23.1**	**8.1**	**5.0**	**10.0**	**76.9**	**42.3**	**34.5**
Canada	100.0	17.1	4.6	6.0	6.5	82.9	45.7	37.1
Czech Republic	100.0	24.7	10.4	2.2	12.1	75.3	41.9	33.4
Denmark	100.0	14.2	2.5	5.4	6.4	85.8	47.0	38.8
England/Northern Ireland (UK)	100.0	14.9	4.4	5.9	4.6	85.1	49.8	35.4
Estonia	100.0	29.3	10.0	3.4	15.9	70.7	43.0	27.7
Finland	100.0	18.5	3.5	5.2	9.7	81.6	39.9	41.6
Germany	100.0	17.9	8.1	3.7	6.2	82.1	45.5	36.5
Australia	100.0	21.8	4.1	3.6	14.1	78.2	39.2	39.0
Ireland	100.0	32.3	10.1	4.7	17.5	67.7	42.2	25.4
Japan	100.0	37.3	10.3	10.9	16.1	62.7	27.7	35.0
Austria	100.0	25.4	9.8	4.1	11.5	74.6	41.5	33.1
Korea	100.0	30.1	15.6	9.1	5.4	70.0	39.5	30.5
Netherlands	100.0	11.4	3.1	3.8	4.6	88.6	46.1	42.5
Flanders (Belgium)	100.0	16.5	7.8	3.7	5.0	83.6	47.2	36.4
Norway	100.0	13.8	1.7	5.3	6.8	86.2	44.3	41.9
Poland	100.0	49.8	19.5	6.5	23.8	50.2	31.0	19.2
Slovak Republic	100.0	36.5	22.1	2.2	12.2	63.5	37.8	25.7
Sweden	100.0	12.0	1.6	4.8	5.7	88.0	44.0	44.0
United States	100.0	16.3	5.5	4.2	6.6	83.7	51.1	32.6

[1] See exhibit 2 for definitions of digital literacy levels.

NOTE: Detail may not sum to totals because of rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Organization for Economic Cooperation and Development (OECD), Program for the International Assessment of Adult Competencies (PIAAC), 2012.

Table A-6. Percentage of workers ages 16 to 65 in each country who use computers at work and who use computers in everyday life: 2012

Country	Percent of workers who use computers at work	Percent of adults who use computers in everyday life
International Average	**71.4**	**83.3**
Canada	74.3	86.3
Czech Republic	65.0	77.9
Denmark	79.2	93.1
England/Northern Ireland (UK)	74.9	85.8
Estonia	63.7	82.7
Finland	79.8	91.2
Germany	69.1	84.9
Australia	76.6	84.2
Ireland	65.3	75.3
Japan	70.9	75.1
Austria	71.1	81.4
Korea	63.0	78.2
Netherlands	79.8	93.6
Flanders (Belgium)	74.4	87.2
Norway	82.9	94.3
Poland	53.7	69.5
Slovak Republic	56.0	68.4
Sweden	82.0	92.2
United States	74.3	80.7

SOURCE: U.S. Department of Education, National Center for Education Statistics, Organization for Economic Cooperation and Development (OECD), Program for the International Assessment of Adult Competencies (PIAAC), 2012

APPENDIX B: STANDARD ERROR TABLES

Table B-1. Standard errrors for Table A-1: Percentage distribution of digital literacy status among U.S. adults ages 16 to 65, by demographic characteristic: 2012

Characteristic	Total, all adults	Not digitally literate				Digitally literate		
		Total	No computer experience	Failed basic computer test	Opted out of computer-based assessment	Total	Level 1 or below	Level 2 or 3
All adults	†	**0.81**	**0.43**	**0.38**	**0.59**	**0.81**	**1.13**	**1.11**
Educational attainment								
Less than high school	†	1.80	1.76	1.11	1.36	1.80	2.11	1.52
High school diploma	†	1.18	0.37	0.54	1.00	1.18	1.49	1.34
Associate's or higher degree	†	0.58	0.20	0.37	0.37	0.58	1.64	1.68
Gender								
Male	†	1.04	0.48	0.56	0.80	1.04	1.46	1.39
Female	†	0.88	0.60	0.41	0.59	0.88	1.36	1.35
Nativity status								
Born in U.S.	†	0.73	0.28	0.37	0.69	0.73	1.23	1.26
Born outside of U.S.	†	2.54	2.46	1.24	0.95	2.54	2.64	1.63
Age								
16–24	†	1.03	0.30	0.85	0.80	1.03	2.71	2.67
25–34	†	1.31	0.73	0.65	0.95	1.31	2.34	2.24
35–44	†	1.32	0.80	0.67	0.77	1.32	2.25	2.05
45–54	†	1.36	0.84	0.87	0.90	1.36	1.98	1.83
55–65	†	1.71	0.98	0.57	1.30	1.71	2.44	1.98
Race/ethnicity								
White	†	0.83	0.33	0.34	0.73	0.83	1.42	1.45
Black	†	1.84	1.10	1.43	1.40	1.84	2.63	1.97
Hispanic	†	3.08	2.61	1.43	1.16	3.08	3.33	2.19
Other race	†	2.15	1.16	1.27	1.34	2.15	3.85	3.90

† Not applicable.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Organization for Economic Cooperation and Development (OECD), Program for the International Assessment of Adult Competencies (PIAAC), 2012.

Table B-2. Standard errors for Table A-2: Percentage distribution of each demographic characteristic among U.S. adults ages 16 to 65, by digital literacy status: 2012

Characteristic	**Total, all adults**	Not digitally literate				Digitally literate		
		Total	No computer experience	Failed basic computer test	Opted out of computer-based assessment	Total	Level 1 or below	Level 2 or 3
Educational attainment								
Less than high school	**0.28**	1.55	2.35	3.11	3.02	0.33	0.61	0.64
High school diploma	**0.48**	1.82	2.40	3.53	3.21	0.60	0.97	1.33
Associate's or higher degree	**0.42**	1.10	1.09	2.89	1.66	0.56	0.89	1.42
Gender								
Male	**0.22**	1.58	3.22	3.39	2.80	0.37	0.87	1.24
Female	**0.22**	1.58	3.22	3.39	2.80	0.37	0.87	1.24
Nativity								
Native-born	**0.50**	2.30	4.94	3.56	2.58	0.43	0.70	0.76
Foreign-born	**0.50**	2.30	4.94	3.56	2.58	0.43	0.70	0.76
Age								
16–24	**0.38**	1.16	0.95	3.32	2.20	0.48	0.99	1.29
25–34	**0.37**	1.32	2.28	2.74	2.24	0.42	0.91	1.08
35–44	**0.31**	1.19	2.45	2.66	1.69	0.35	0.80	1.10
45–54	**0.37**	1.77	2.75	3.71	2.39	0.41	0.82	1.11
55–65	**0.24**	1.54	3.30	2.40	2.53	0.38	0.88	1.08
Race/ethnicity								
White	**0.91**	2.42	3.89	3.75	3.51	1.00	1.40	1.65
Black	**0.10**	1.66	2.92	3.31	2.78	0.29	0.65	0.74
Hispanic	**0.42**	2.23	4.94	4.32	1.88	0.43	0.88	0.92
Other race	**0.79**	1.14	1.88	2.08	1.56	0.87	1.13	1.00

SOURCE: U.S. Department of Education, National Center for Education Statistics, Organization for Economic Cooperation and Development (OECD), Program for the International Assessment of Adult Competencies (PIAAC), 2012.

Table B-3. Standard errors for Table A-3: Percentage distribution of digital literacy status among U.S. adults ages 16 to 65, by employment characteristic: 2012

Characteristic	**Total, all adults**	Not digitally literate				Digitally literate		
		Total	No computer experience	Failed basic computer test	Opted out of computer-based assessment	Total	Level 1 or below	Level 2 or 3
All adults	†	**0.81**	**0.43**	**0.38**	**0.59**	**0.81**	**1.13**	**1.11**
Employment and labor force status								
Employed	†	0.86	0.45	0.40	0.61	0.86	1.32	1.27
Unemployed	†	1.58	0.47	0.71	1.51	1.58	3.38	3.30
Not in the labor force	†	1.56	1.04	0.94	1.09	1.56	1.96	1.86
Occupation skill level (among the employed)								
Skilled occupations	†	0.63	0.18	0.38	0.52	0.63	1.54	1.60
Semi-skilled white-collar occupations	†	1.38	0.69	0.52	1.03	1.38	1.92	1.64
Semi-skilled blue-collar occupations	†	2.08	1.27	0.96	1.47	2.08	2.43	1.92
Unskilled occupations	†	3.02	2.44	1.65	1.67	3.02	3.54	2.87

† Not applicable.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Organization for Economic Cooperation and Development (OECD), Program for the International Assessment of Adult Competencies (PIAAC), 2012.

Table B-4. Standard errors for Table A-4: Percentage distribution of each employment characteristic among U.S. adults ages 16 to 65, by digital literacy status: 2012

Characteristic	Total, all adults	Not digitally literate				Digitally literate		
		Total	No computer experience	Failed basic computer test	Opted out of computer-based assessment	Total	Level 1 or below	Level 2 or 3
Labor force status								
In the labor force	**0.70**	1.76	3.04	3.42	2.55	0.69	1.04	1.03
Not in the labor force	**0.70**	1.76	3.04	3.42	2.55	0.69	1.04	1.03
Employment status (among those in the labor force)								
Employed	**0.47**	1.25	1.29	1.71	2.58	0.49	0.83	0.87
Unemployed	**0.47**	1.25	1.29	1.71	2.58	0.49	0.83	0.87
Occupation (among the employed)								
Skilled occupations	**0.77**	1.46	1.96	3.32	2.51	0.88	1.19	1.62
Semi-skilled white-collar occupations	**0.68**	2.16	3.84	3.59	3.55	0.79	1.09	1.22
Semi-skilled blue-collar occupations	**0.67**	2.19	4.08	3.05	3.35	0.72	0.90	0.97
Unskilled occupations	**0.47**	1.59	4.31	3.48	2.86	0.51	0.72	0.81

SOURCE: U.S. Department of Education, National Center for Education Statistics, Organization for Economic Cooperation and Development (OECD), Program for the International Assessment of Adult Competencies (PIAAC), 2012.

Table B-5. Standard errors for Table A-5: Percentage distribution of digital literacy status among adults ages 16 to 65, by country: 2012

Country	Total, all adults	Not digitally literate				Digitally literate		
		Total	No computer experience	Failed basic computer test	Opted out of computer-based assessment	Total	Level 1 or below	Level 2 or 3
International Average	†	**0.14**	**0.09**	**0.08**	**0.12**	**0.14**	**0.21**	**0.19**
Canada	†	0.39	0.18	0.25	0.27	0.39	0.58	0.56
Czech Republic	†	0.93	0.50	0.28	0.85	0.93	1.22	1.14
Denmark	†	0.34	0.18	0.23	0.28	0.34	0.76	0.72
England/Northern Ireland (UK)	†	0.58	0.30	0.35	0.40	0.58	0.97	0.88
Estonia	†	0.44	0.31	0.25	0.44	0.44	0.83	0.76
Finland	†	0.47	0.27	0.29	0.41	0.47	0.81	0.74
Germany	†	0.65	0.54	0.36	0.49	0.65	1.02	0.84
Australia	†	0.69	0.28	0.30	0.61	0.69	1.05	1.05
Ireland	†	0.75	0.38	0.37	0.69	0.75	1.03	0.83
Japan	†	0.99	0.46	0.67	0.91	0.99	0.91	0.84
Austria	†	0.64	0.45	0.33	0.50	0.64	0.90	0.80
Korea	†	0.55	0.41	0.40	0.32	0.55	0.85	0.82
Netherlands	†	0.46	0.24	0.28	0.29	0.46	0.81	0.78
Flanders (Belgium)	†	0.48	0.35	0.27	0.32	0.48	0.80	0.82
Norway	†	0.46	0.18	0.30	0.36	0.46	0.83	0.77
Poland	†	0.64	0.52	0.37	0.66	0.64	0.84	0.76
Slovak Republic	†	0.73	0.66	0.21	0.44	0.73	0.89	0.76
Sweden	†	0.52	0.23	0.35	0.35	0.52	0.81	0.74
United States	†	0.81	0.43	0.38	0.59	0.81	1.13	1.11

† Not applicable.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Organization for Economic Cooperation and Development (OECD), Program for the International Assessment of Adult Competencies (PIAAC), 2012.

Table B-6. Standard errors for Table A-6: Percentage of workers ages 16 to 65 in each country who use computers at work and who use computers in everyday life: 2012

Country	Percent of workers who use computers at work	Percent of adults who use computers in everyday life
International Average	**0.17**	**0.12**
Canada	0.50	0.30
Czech Republic	1.22	1.06
Denmark	0.58	0.24
England/Northern Ireland (UK)	0.77	0.53
Estonia	0.75	0.38
Finland	0.59	0.36
Germany	0.84	0.59
Australia	0.65	0.57
Ireland	0.83	0.52
Japan	0.67	0.63
Austria	0.85	0.57
Korea	0.76	0.53
Netherlands	0.51	0.33
Flanders (Belgium)	0.78	0.48
Norway	0.50	0.36
Poland	0.80	0.52
Slovak Republic	1.03	0.61
Sweden	0.68	0.44
United States	0.74	0.68

SOURCE: U.S. Department of Education, National Center for Education Statistics, Organization for Economic Cooperation and Development (OECD), Program for the International Assessment of Adult Competencies (PIAAC), 2012