Analyzing U.S. Young Adults' Skills by Student and Employment Status:

Methodology for a New PIAAC Variable with Initial Results

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U.S. DEPARTMENT OF EDUCATION

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June 2018

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Introduction

Why focusing on the skills of U.S. young adults matters

The Program for the International Assessment of Adult Competencies (PIAAC) is a cyclical, large-scale study of adult skills and life experiences focusing on education and employment. It is coordinated by the Organization for Economic Cooperation and Development (OECD) and developed by participating countries with the support of the OECD. Between 2011 and 2015, PIAAC surveyed a nationally representative sample of adults between the ages of 16 and 65 in 33 countries and regions.[1] The survey focused on cognitive skills in three domains: literacy, numeracy, and problem solving in technology-rich environments. In addition, it collected data about educational background, family background, health and skill use on the job and outside of work. See appendix A for more technical information about the assessment.

PIAAC results showed that U.S. adults (age 16 to 65) were not, on average, among the highest performers in any of the domains when compared internationally, and that U.S. young adults (age 16 to 34) performed particularly poorly compared to their international peers (OECD, 2013; Goodman et al., 2015). The average score of U.S. young adults in numeracy and problem solving in technology-rich environments was below the international average (of participating countries), though not measurably different from the international average in literacy. Compared with young adults in other participating countries, the United States scored lower, on average, than 12 countries in literacy, 21 countries in numeracy, and 17 countries in problem solving in technology-rich environments (table 1).

It is important to take a closer look at the relatively poor performance of U.S. young adults as well as how their skills relate to the pathways they take from high school into the labor force. To assist researchers interested in examining the transition of young adults into the labor force, this report introduces a new U.S. PIAAC student-and-employment status variable, explains how this new variable was developed, and provides a first look at the results for U.S. young adults analyzed using this variable to classify by student and employment status.

About this report

This report is intended primarily for researchers using PIAAC data to investigate policy issues related to young adults and their transition into the labor force. The content of this report is primarily methodological and assumes that the reader has an understanding of basic statistical analysis. However, recognizing both that policymakers may also be interested in the findings that are possible with this new variable, and that the PIAAC International Data Explorer makes data analysis possible online for the general public, we have sought to keep the discussion accessible to these audiences and to provide a short review of the basic patterns of performance that emerge when using this new variable.

Results in this report are presented: (1) as average scale scores (estimated on a 0–500 scale) in the three domains of literacy, numeracy, and problem solving in technology-rich environments, and (2) as percentages of young adults reaching the proficiency levels established for each of these

[1] PIAAC rounds 1 and 2 combined include 33 countries; The NCES database does not include data for The Russian Federation, Australia, or Indonesia. Table 1 presents results for the 30 countries shown.

TABLE 1.

Average scores of adults age 16 to 34 on the PIAAC literacy, numeracy, and problem solving in technology-rich environments (PS-TRE) scales, by participating country and region: 2012–2015

Participating country/region	Average literacy score	Participating country/region	Average numeracy score	Participating country/region	Average PS-TRE score
Japan	305	Finland	294	Finland	307
Finland	303	Japan	291	Japan	306
Netherlands	296	Flanders (Belgium)	289	Sweden	303
Korea	291	Netherlands	289	Singapore	303
Flanders (Belgium)	288	Singapore	286	Netherlands	300
Estonia	286	Czech Republic	284	Norway	299
Sweden	286	Sweden	283	Denmark	298
Singapore	285	Estonia	281	Flanders (Belgium)	298
Czech Republic	284	Korea	281	Korea	298
Norway	282	Austria	281	Czech Republic	297
New Zealand	282	Lithuania	280	New Zealand	297
Canada	281	Denmark	280	Austria	295
Germany	280	Germany	279	Germany	295
Denmark	279	Slovak Republic	278	Canada	293
Poland	279	Norway	278	Estonia	291
Austria	279	Slovenia	273	England/N. Ireland (UK)	290
Lithuania	277	Canada	273	**International average**	**289**
Slovak Republic	277	**International average**	**271**	Slovak Republic	286
United States	**277**	New Zealand	271	Ireland	285
International average	**277**	Poland	270	Poland	283
France	277	Cyprus	269	Slovenia	283
Ireland	274	France	267	**United States**	**282**
England/N. Ireland (UK)	273	Ireland	262	Israel	282
Cyprus	271	England/N. Ireland (UK)	262	Lithuania	271
Slovenia	271	**United States**	**261**	Chile	263
Israel	266	Israel	258	Greece	261
Spain	263	Italy	258	Turkey	257
Italy	260	Spain	257		
Greece	257	Greece	255		
Chile	236	Turkey	231		
Turkey	235	Chile	221		

Score is significantly **higher** than the U.S. average score

Score is **not** significantly different from the U.S. average score

Score is significantly **lower** than the U.S. average score

NOTE: PIAAC literacy and numeracy results are reported on a 0-500 scale. Countries and regions are listed in descending order based on their unrounded average scores. Cyprus, France, Italy, and Spain did not participate in the PIAAC problem solving in technology-rich environments assessment. Data for the United States are the U.S. PIAAC 2012/14; data for Chile, Greece, Israel, Lithuania, New Zealand, Singapore, Slovenia, and Turkey are from 2014; data for all other countries are from 2012. The NCES database does not include data for The Russian Federation, Australia, or Indonesia.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Program for the International Assessment of Adult Competencies (PIAAC), U.S. PIAAC 2012/2014; Organization for Economic Cooperation and Development, PIAAC 2012–2015.

domains. There are five proficiency levels for literacy and numeracy (below Level 1, Level 1, Level 2, Level 3, and Level 4/5) and four levels for problem solving in technology-rich environments (below Level 1, Level 1, Level 2, and Level 3). This report combines the top two proficiency levels (Levels 4 and 5) for the literacy and numeracy scales, following the OECD's reporting convention (OECD, 2013), because across all participating countries, no more than 2 percent of adults reached Level 5.

As in all NCES reports, any reported difference in this report is based on statistical testing. All statistically significant differences described in this report are significant at the .05 level. No statistical adjustments to account for multiple comparisons have been used. Differences that are statistically significant are discussed using comparative terms such as "higher" and "lower." Differences that are not statistically significant are either not discussed or referred to as "not measurably different" or "not statistically significant." In this case, failure to find a difference as statistically significant does not necessarily mean that there was no difference. It could be that a real difference cannot be detected by the significance test because of a small sample size or an imprecise measurement in the sample. If the statistical test is significant, it means that there is convincing evidence (though no guarantee) of a real difference in the population. However, it is important to remember that statistically significant results do not necessarily identify those findings that have policy significance or practical importance. (See appendix A for more details on statistical testing.) This report provides findings for only a few select results; more PIAAC results can be generated with U.S. PIAAC data in the NCES International Data Explorer (IDE) at http://nces.ed.gov/surveys/international/ide/. Additional PIAAC results and resources are available from the NCES PIAAC website, at https://nces.ed.gov/surveys/piaac/.

The challenge of studying young adults

Researchers who wish to use PIAAC data to analyze the transition of young adults into the labor force face a challenge identifying and choosing variables to use in the PIAAC dataset. There are several variables for employment and education status that would seem appropriate to identify different stages of transition into the labor force of young adults (exhibit 1). However, as they are separate variables, any analysis that calls for a detailed look at the status of young adults both in and out of the labor force, taking into consideration their education status, requires considering how to combine variables into meaningful analytical categories. This is not a simple matter and requires understanding the differences between these variables.

For example, the three variables that identify employment status differ in fundamental ways (see exhibit 1 – upper panel). The most obvious variable to use to look at employment status is *CQ07*, which captures respondents' answers when asked to select one of ten categories (e.g., full-time employed, part-time employed, unemployed, student, permanently disabled, etc.) that "best describes your current situation." However, the PIAAC system-derived variable *CD05* is most widely used to identify employment status, as it matches the International Labor Organization's (ILO) definition for the currently active population based on a reference period of one week.[2] The third variable that can be used, *EMP6CAT*, indicates both employment status and intensity of work by combining the categories from *CD05* with self-reported information on the number of

[2] The variable *CD05* is the standard variable for reporting employment status in the international OECD and national NCES reports.

hours worked in the last week (*DQ10*). Using the information on hours worked allows one to determine full- versus part-time employment in a consistent manner for all respondents. The data from *CQ07* in contrast, based on personal judgment, do not offer this consistency and often differ from the strict categorization of the ILO's definition of currently active population (see appendix B for details).

Likewise, the three variables that identify education status also have important differences (see exhibit 1 – lower panel). Variable *BQ02A* captures whether a person is *currently* in any formal education program. The other two variables measure formal program participation in the last 12 months for the whole population (*FE12*) and for the population excluding youth 16 to 24 years of age in their initial cycle of studies (*FAET12*).

Exhibit 1.

Employment and education variables in PIAAC

Employment variables			
Variable ID	*CQ07*	*CD05*	*EMP6CAT*
Survey question or label	Which describes your current situation best?	Current status/work history - employment status (derived by CAPI computer software)[1]	Employment status (derived, 6 categories)
Response categories	Full-time employed (self-employed, employee); Part-time employed (self-employed, employee); Unemployed; Pupil, student; Apprentice, internship; In retirement or early retirement; Permanently disabled; In compulsory military or community service; Fulfilling domestic tasks or looking after children/family; Other; Don't know	Employed; Unemployed; Out of the labor force; Not known; Don't know	Employed and work 35+ hours per week; Employed and work 15-34 hours per week; Employed and work 1-14 hours per week; Employed and unknown work hours; Unemployed; Out of the labor force
Education variables			
Variable ID	*BQ02A*	*FE12*	*FAET12*
Survey question or label	Are you currently studying for any kind of formal degree or certificate?	Participated in formal education in 12 months preceding the survey (derived)	Participated in formal adult education/training (AET) in 12 months preceding the survey (see AETPOP - derived)[2]
Response categories	Yes; No; Don't know	Did not participate in formal education; Participated in formal education; Don't know	Did not participate in formal AET; Participated in formal AET; Don't know

[1] Details on the definition and derivation of employment status, CD05, can be found in Section C of the OECD's PIAAC Conceptual Framework of the Background Questionnaire Main Survey accessed at http://www.oecd.org/skills/piaac/PIAAC(2011_11)MS_BQ_ConceptualFramework_1%20Dec%202011.pdf.

[2] Details on the derivation of AETPOP (Adult education/training population), which excludes youths age 16 to 24 in initial cycle of studies, can be found in the OECD's PIAAC Derived variables codebook accessed at http://www.oecd.org/skills/piaac/codebook%20for%20DVs%203_16%20March%202015.docx.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Program for the International Assessment of Adult Competencies (PIAAC), U.S. PIAAC 2012/2014; Organization for Economic Cooperation and Development, PIAAC 2012.

Yet even knowing the differences between these variables, there are multiple possible permutations for combining employment and education variables to create meaningful analytical categories with which to identify different stages of transition into the labor force for young adults. The simplest and most straightforward is to cross *CD05* by the "currently studying" variable *BQ02A*. However, this combination will result in having students in every category of employment status and vice versa (see table 2). This combination has been used by the *OECD Skills Outlook 2015* (p. 81) to identify "disengaged" young adults who presently are neither in education nor employed (sometimes referred to as "NEETs"), classifying those that are unemployed and out of the labor force (*CD05*) and not currently studying (*BQ02A*) as NEETs. This combination's category of neither in education nor employed provides a reasonable way to identify NEETs, but some of the other resulting categories (e.g., employed students, unemployed students, students out of the labor force, etc.) are arguably not analytically distinct (or informative) stages of transition into the labor force.

TABLE 2.

Percentage of U.S. adults age 16 to 34 assessed in PIAAC, by current status/work history—employment status (derived) (CD05) and education—currently studying (BQ02A): 2012 and 2014

Education status - currently studying	Employment status		
	Employed	Unemployed	Out of the labor force
Yes	58	11	30
No	81	8	12

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

SOURCE: U.S. Department of Education, National Center for Education Statistics, Program for the International Assessment of Adult Competencies (PIAAC), U.S. PIAAC 2012/2014; Organization for Economic Cooperation and Development, PIAAC 2012.

A variation on the OECD approach (2015) produced the derived variable *EDWORK* (in the PIAAC dataset), which modifies the simple cross of *CD05* by *BQ02A* with information about participation during the last 12 months in formal education, and also in non-formal adult education/training (variables *FE12* and *NFE12*[3]). *EDWORK* provides six categories of young adults: those in education only; in education and working (either full- or part-time); working only (either full- or part-time); not in education or working but have participated in formal or non-formal training in the last 12 months; and those not in education or working and who have not participated in formal or non-formal training in the last 12 months. (This last category is used to create the variable named *NEET* in the PIAAC dataset[4]). *EDWORK* allows researchers to identify analytically distinct stages of the transition into the labor force from a perspective that prioritizes education and training, but is of less value when needing to focus on the transition into the labor force from a labor market perspective. *EDWORK* makes no distinction between being actively engaged in formal education *at present* versus only having participated *once in the last 12 months*. It also treats participating in non-formal education

[3] Not highlighted in exhibit 1 because this variable focuses on participation in *non-formal* education and training in 12 months preceding the survey.

[4] Note that results with the PIAAC derived variable *NEET* differ from those reported in the *OECD Skills Outlook 2015* (p. 81). The variable *NEET* does not classify as NEETs any young adult who reported formal or non-formal training in the last 12 months. In contrast, the OECD report classifies as NEETs young adults who reported adult training or participation in formal education in the past 12 months if they were not *currently* studying for any kind of formal degree or certificate. Both are proxy measures for the policy concept of NEETs, based on different definitions of what it means to be "not in education nor employed."

equally with formal education. Thus, some argue that the PIAAC variable *NEET* is a narrow or "restrictive definition, because some respondents have participated in training in the 12 months prior to the survey, but have been inactive for a number of months before the survey" and they are excluded from the cases identified as NEETs (OECD, 2015, p. 80). Furthermore, *NEET* does not allow one to distinguish between young adults who are looking for employment and those who are not, and a good case can be made that young adults who are looking for employment (unemployed) may require different interventions than those who are not active in the labor force (out of the labor force). Therefore, combining these two categories may present challenges in creating targeted policy interventions.

In addition to these various issues, both of these approaches for combining employment and education variables are also problematic for another reason. The simple dichotomy between student and non-student ignores the body of research emerging on the relationship between education, intensity of work, and/or cognitive outcomes. This research calls into question the traditional assumption that students who work should be considered lesser (or less focused) students than those who do not work. For example, Dundes and Marx (2006) conclude that, based on their sample of undergraduate students, working a moderate number of hours helps youth in post-school labor market outcomes without compromising school achievement. Quintini (2015, p. 17) reports "no sizeable differences in proficiency [are observed] based on hours worked, after controlling for individual characteristics, education level and type of work and study experience" for youth 16 to 29 years of age.

In sum, the task of selecting variables and deciding how to combine them to analyze the transition of young adults into the labor force requires a researcher to wade through an extensive set of questions and choices to determine (a) how to create (and justify) analytical categories or (b) whether to use the variables available in the PIAAC dataset. To simplify this process for those interested in examining the transition of young adults into the labor force from a labor market perspective, NCES has developed a new variable, presented in this report, that addresses these challenges and uses categories that are more policy relevant and more intuitive to understand than existing choices.

U.S. Student and Employment Status Variable

NCES has created the *student and employment status* variable to allow policymakers and others interested in issues related to young adults transitioning into the labor force to analyze PIAAC data simply and efficiently. This variable distinguishes young adults who are primarily students from those who are primarily workers, as well as those who are not students and are unemployed or out of the labor force (exhibit 2). Although the intensity of the formal education status (i.e., full- or part-time study) was not specifically collected in PIAAC, all young adults who are studying and not in the labor force full-time are assumed to be focusing on their studies and are therefore categorized as *primarily students* in their transition. Meanwhile, young adults who are employed full-time, regardless of their educational status, and those who are employed part-time, but not currently studying, are both assumed to have begun developing careers and are therefore categorized as *primarily workers* in their transition. These categories permit analyses of "engaged" young adults who are continuing their education or who have joined the labor force. The student and employment status variable also allows researchers to distinguish between young adults who are primarily workers with full-time jobs versus those with part-time jobs. The last two categories of non-students, *unemployed* and *out of the labor force*, can be combined to analyze the concept of NEETs[5], or they can be used separately to examine in a more nuanced way (than the concept of NEETs permits) the different levels of engagement (or lack of engagement) with the labor market.

Exhibit 2.

Student and employment status variable categories for U.S. adults age 16 to 34

Student and employment status (*EMPSTAT*) variable category label	Transition category	Primary activity category
Students (employed part-time, unemployed, or out of the labor force)	Primarily students	Studying
Full-time employed (student or non-student)	Primarily workers	Full-time employed
Part-time employed (non-student)		Part-time employed
Unemployed (non-student)	Unemployed	Not in formal education and looking for work
Out of the labor force (non-student)	Out of the labor force	Not in formal education and not looking for work

SOURCE: U.S. Department of Education, National Center for Education Statistics, Program for the International Assessment of Adult Competencies (PIAAC), U.S. PIAAC 2012/2014; Organization for Economic Cooperation and Development, PIAAC 2012.

The classification scheme used to create the *student and employment status* variable relies on data from three variables, which classify young adults according to the criteria listed in exhibit 3. Specifically, the *student and employment status* variable is based on *CD05* and *DQ10* (combined into *EMP6CAT*) and *BQ02A*, so it,

- aligns with the ILO's definition and official PIAAC reports of employment, and
- restricts the category of "students" to young adults *currently* enrolled in formal education.

[5] Note that combining these two categories produces the same proxy for the policy category "NEETs" as that used in the *OECD Skills Outlook 2015*, which differs from the variable *NEET* as described in footnote 4.

The latter restriction makes for a more conservative than expansive construction of "student," but this definition aligns with common assumptions of what "student" means. (In contrast, *EDWORK*'s corresponding category of young adults "in education only" includes individuals who took a formal or non-formal course once within the past 12 months and excludes young adults enrolled in a formal education program who are employed part-time.)

The construction of this variable distinguishes between the young adult population who are most involved in skill-use and skill-producing activities (i.e., students and those employed full-time), and those who are not (i.e., non-students who either work part-time, are unemployed, or are out of the labor force). This distinction rests in part on the strong link established between formal education and skills across all age groups (Goodman et al., 2015; OECD, 2015). Average scores for the student and employment subgroups across PIAAC's three assessed domains (literacy, numeracy, and problem solving in technology-rich environments) validate this variable's classification scheme (see table 3). Students scored higher, on average, in all three domains than non-students across all the employment status categories. And both students and non-students who were employed full-time scored higher, on average, than non-students in the other employment status categories. (See appendix B for more information about the construction of the student and employment status variable.)

Exhibit 3.

Criteria for student and employment variable categorization

Variable categories (*EMPSTAT*)	Criteria for categorization		
	Response to the question "Are you currently studying for any kind of formal degree or certificate?" (*BQ02A*)	Employment status (*CD05*)	Number of hours worked per week (*DQ10*)
Students (employed part-time, unemployed, or out of the labor force)	Yes	Employed part-time, unemployed, or out of the labor force	34 or fewer
Full-time employed (student or non-student)	Yes or no	Employed	35 or more
Part-time employed (non-student)	No	Employed	34 or fewer
Unemployed (non-student)	No	Unemployed	0
Out of the labor force (non-student)	No	Out of the labor force	0

SOURCE: U.S. Department of Education, National Center for Education Statistics, Program for the International Assessment of Adult Competencies (PIAAC), U.S. PIAAC 2012/2014; Organization for Economic Cooperation and Development, PIAAC 2012.

TABLE 3.

Percentage distribution of U.S. adults age 16 to 34 and their average scores on the PIAAC literacy, numeracy, and problem solving in technology-rich environments (PS-TRE) scales , by current employment status, whether currently studying for formal degree/certificate, and age interval: 2012 and 2014

Current employment status	Age 16 to 34		Age 16 to 24		Age 25 to 34	
	Studying for formal degree/ certificate	Not studying for formal degree/ certificate	Studying for formal degree/ certificate	Not studying for formal degree/ certificate	Studying for formal degree/ certificate	Not studying for formal degree/ certificate
Percentage distribution						
Full-time employed (worked 35 or more hours per week)	18	82	24	76	15	85
Part-time employed (worked 1-34 hours per week)	58	42	73	27	30	70
Unemployed	48	52	61	39	25	75
Out of the labor force	62	38	78	22	27	73
Average literacy score						
Full-time employed (worked 35 or more hours per week)	291	280	281	273	296	283
Part-time employed (worked 1-34 hours per week)	282	270	280	265	292	273
Unemployed	268	256	266	258	278	254
Out of the labor force	278	266	275	267	‡	266
Average numeracy score						
Full-time employed (worked 35 or more hours per week)	277	268	262	257	286	271
Part-time employed (worked 1-34 hours per week)	267	250	264	242	279	255
Unemployed	245	232	243	233	257	231
Out of the labor force	257	244	254	241	‡	245
Average PS-TRE score						
Full-time employed (worked 35 or more hours per week)	290	284	283	280	294	285
Part-time employed (worked 1-34 hours per week)	287	274	288	271	285	275
Unemployed	275	263	275	264	274	263
Out of the labor force	284	276	282	275	‡	278

‡ Reporting standards not met.

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

SOURCE: U.S. Department of Education, National Center for Education Statistics, Program for the International Assessment of Adult Competencies (PIAAC), U.S. PIAAC 2012/2014; Organization for Economic Cooperation and Development, PIAAC 2012.

The new student and employment status variable permits analyses to address questions that are difficult or impossible to address without this classification scheme. These include questions about,

- the differences between NEETs who are unemployed versus NEETs who are out of the labor force;
- the extent of remedial education and job training required by and provided for full-time, part-time, or unemployed young adults;
- how efficient the market is at employing the most skilled young adults; and
- the scope of skill mismatch among young adults in different stages of transition to the labor force.

This variable can also be applied to compare young adults' transition into the labor force internationally to get insight into the effects of specific features of labor markets in different countries (e.g., the impact of apprenticeships in Germany). For more information on how the variable can be created for other countries see coding in appendix B.

There are, however, some important limitations of this variable to keep in mind when analyzing young adults with PIAAC 2012/14 data. First, sample sizes across the categories are not uniform. For example, the category out of the labor force has only 327 cases, which is not sufficient to support an in-depth analysis of, for example, race/ethnicity by education attainment for just young adults in this category. However, the categories of student and full-time employed, with 1,287 and 1,490 cases, respectively, can support such an analysis. Thus, the same depth of analysis is not always possible across all categories (see appendix B for the sample sizes for all categories). Second, in order to have sufficient sample sizes for analyses, young adults are typically defined as 16 to 34 years old. However, the populations of young adults age 16 to 24 and age 25 to 34 may be at different stages in their transition into the labor force.

To give a sense of the differences between these two groups, this report includes the breakouts in table 3 to show the percentage distribution and average scale scores across the age group of 16 to 34 in comparison with both the age groups 16 to 24, and 24 to 34 for all the employment status categories by whether or not they were currently studying for a formal degree or certificate. Table 3 shows a markedly different pattern between these two age groups in regards to "currently studying" for a formal degree or certificate among those classified as employed part-time, unemployed, and out of the labor force. For all three of these employment categories, a larger percentage of young adults in the age group 16 to 24 than in the age group 24 to 34 were currently studying. In contrast, there was relatively little difference between these two age groups in regards to "currently studying" among those classified as employed full-time. The great majority of full-time employed young adults in both the age groups 16 to 24 and 24 to 34 were not currently studying for a formal degree or certificate (76 and 85 percent, respectively).

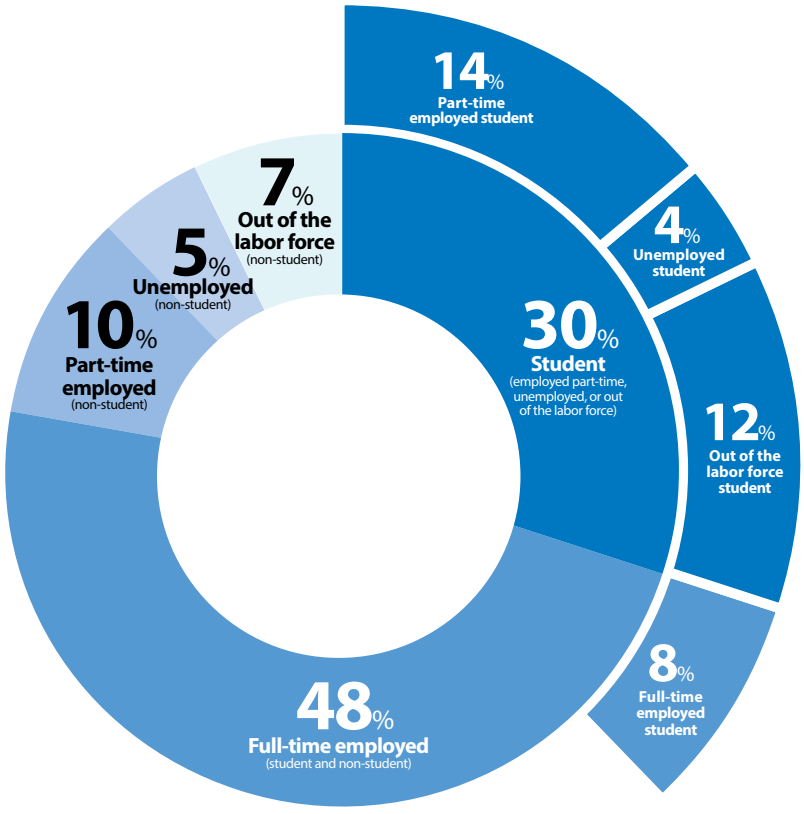
A First Look at U.S. PIAAC Data With the Student and Employment Status Variable

Statistical profile of U.S. young adults and their performance by student and employment status

Looking at young adults age 16 to 34 in the United States with the student and employment status variable, one finds nearly 78 percent were either students or employed full-time, with 30 percent of young adults classified as students, and nearly one-half (48 percent) classified as employed full-time (figure 1). As previously discussed, however, age was an important factor that influenced these percentage distributions. Among those 16- to 34-year-olds, the young adults age 16 to 24 comprised the majority (84 percent) of those in the student category, while those age 25 to 34 made up the majority (73 percent) of the full-time employed category (figure 2).[6]

FIGURE 1.

Percentage distribution of U.S. adults age 16 to 34, by current student and employment status: 2012 and 2014



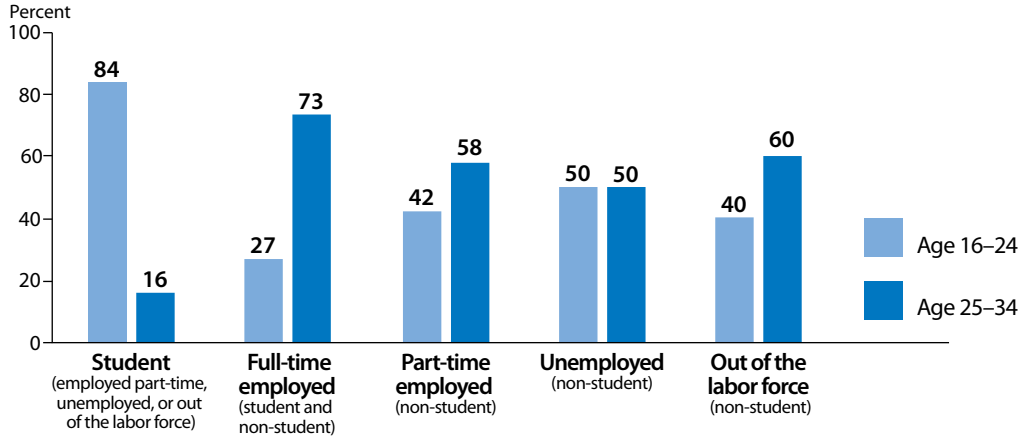
NOTE: Detail may not sum to totals because of rounding. See exhibit 3 in this report for more information on how the categories of the student and employment status variable were derived.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Program for the International Assessment of Adult Competencies (PIAAC), U.S. PIAAC 2012/2014; Organization for Economic Cooperation and Development, PIAAC 2012.

[6] For a breakdown of the sample sizes for the variable categories, please see appendix B.

FIGURE 2.

Percentage distribution of U.S. adults age 16 to 34, by current student and employment status and age interval: 2012 and 2014



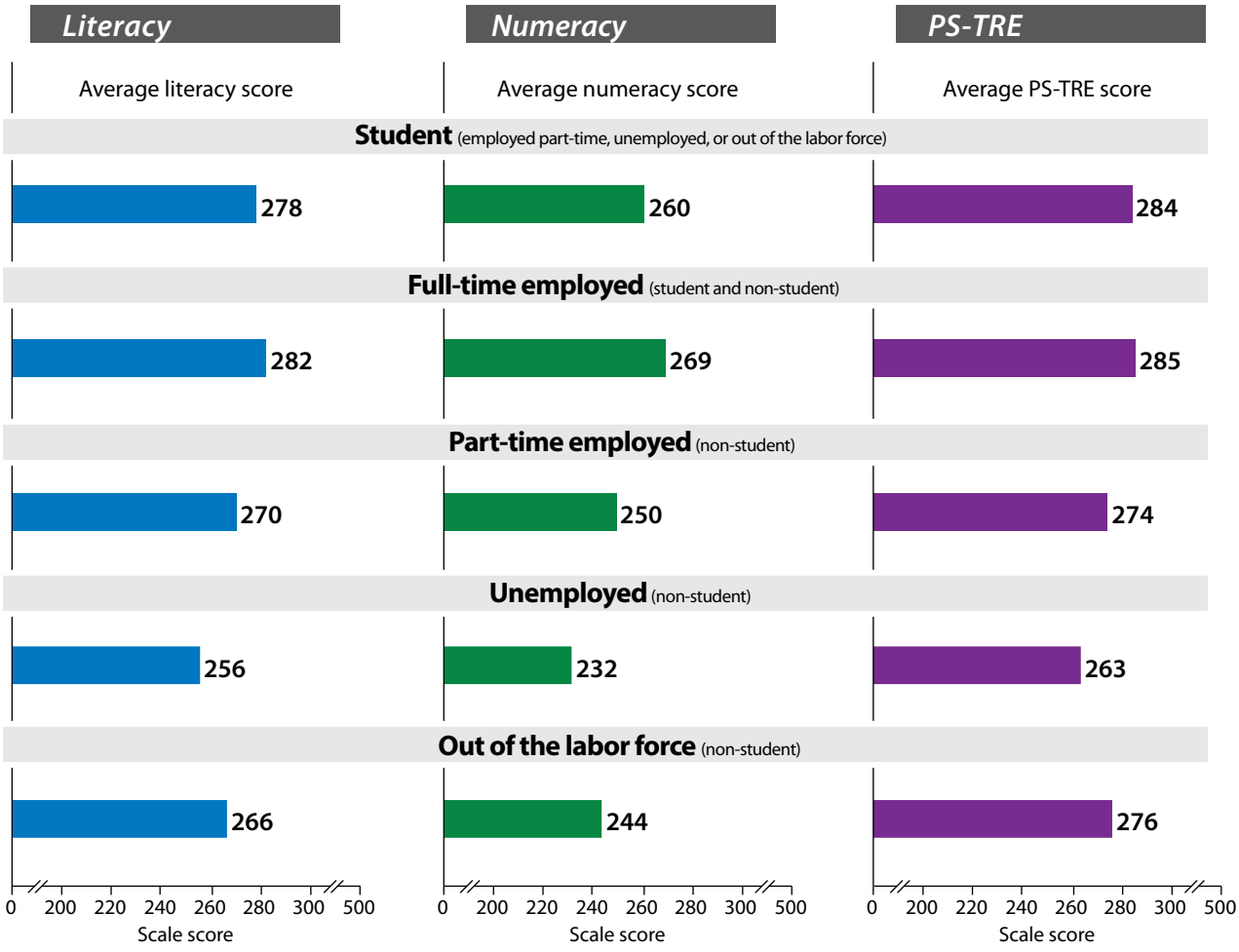
NOTE: Detail may not sum to totals because of rounding. See exhibit 3 in this report for more information on how the categories of the student and employment status variable were derived.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Program for the International Assessment of Adult Competencies (PIAAC), U.S. PIAAC 2012/2014; Organization for Economic Cooperation and Development, PIAAC 2012.

Patterns of performance clearly emerged when looking at average scores in the three PIAAC domains across the categories of student and employment status. In literacy and numeracy, young adults age 16 to 34 who were classified as students or employed full-time scored higher on average than young adults who were non-students employed part-time, unemployed, or out of the labor force. In literacy and problem solving in technology-rich environments, the scores of students and those employed full-time were not measurably different. In numeracy, however, young adults employed full-time scored higher on average than students (figure 3).

FIGURE 3.

Average scores of U.S. adults age 16 to 34 on the PIAAC literacy, numeracy, and problem solving in technology-rich environments (PS-TRE) scales, by current student and employment status: 2012 and 2014



NOTE: See exhibit 3 in this report for more information on how the categories of the student and employment status variable were derived.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Program for the International Assessment of Adult Competencies (PIAAC), U.S. PIAAC 2012/2014; Organization for Economic Cooperation and Development, PIAAC 2012.

These patterns in the average scores for students and full-time employed young adults were replicated to some degree in the percentage of the lowest performers among the student and employment status categories (figures 4-A, B, and C). In literacy and problem solving in technology-rich environments, there was no measurable difference in the percentage of students and those employed full-time at the lowest proficiency levels (at or below Level 1). In numeracy, there was a smaller percentage of young adults employed full-time who scored at or below Level 1 compared to those in all the other categories.

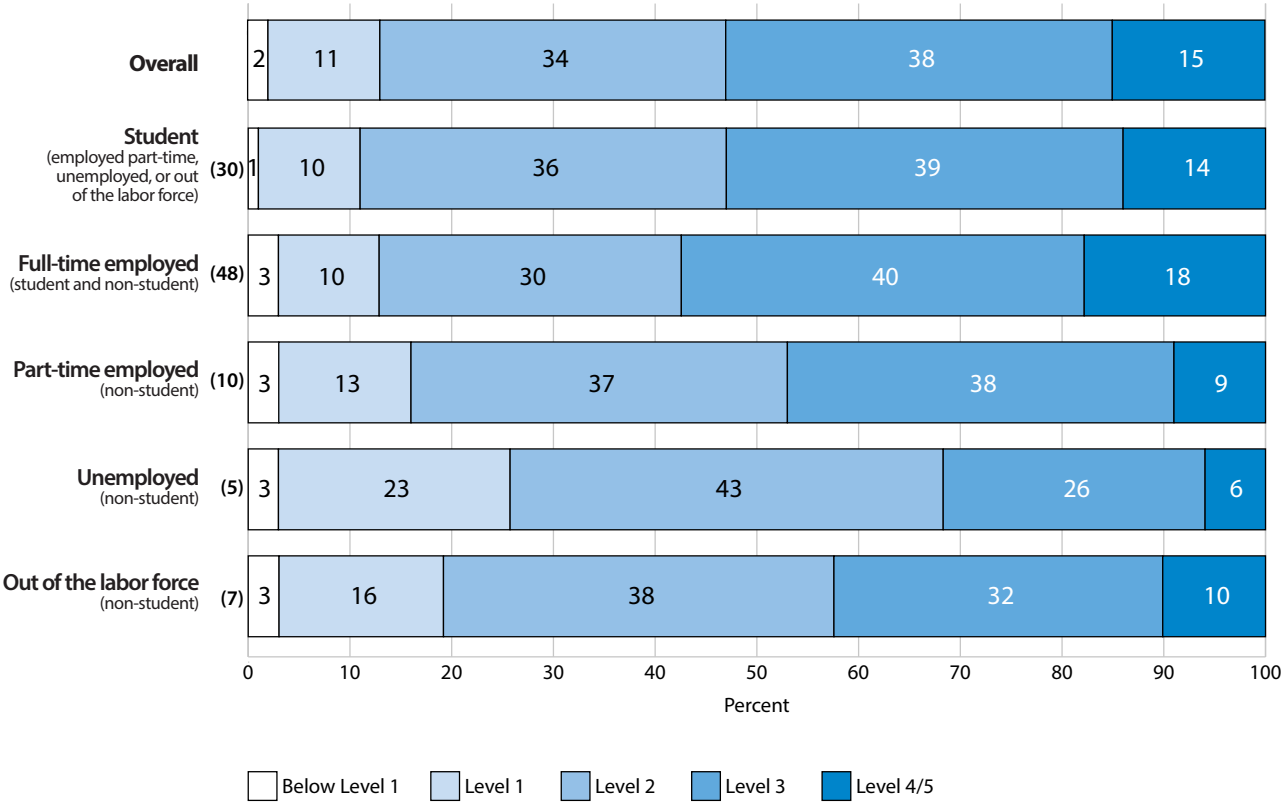
While the relative performance of young adults among the student and employment status categories is noteworthy, so, too, are the actual percentages of young adults who performed at the lowest proficiency levels. In literacy, 26 percent of unemployed young adults and 20 percent of those out of the labor force performed at or below Level 1. In numeracy, nearly

one-half of unemployed young adults (47 percent) performed at the lower end of the distribution (at or below Level 1), as did 36 percent of those out of the labor force. In problem solving in technology-rich environments, 73 percent of unemployed young adults and 62 percent of those out of the labor force performed at or below Level 1.

Literacy

FIGURE 4-A.

Percentage of U.S. adults age 16 to 34 at each level of proficiency on the PIAAC literacy scale, by current student and employment status: 2012 and 2014

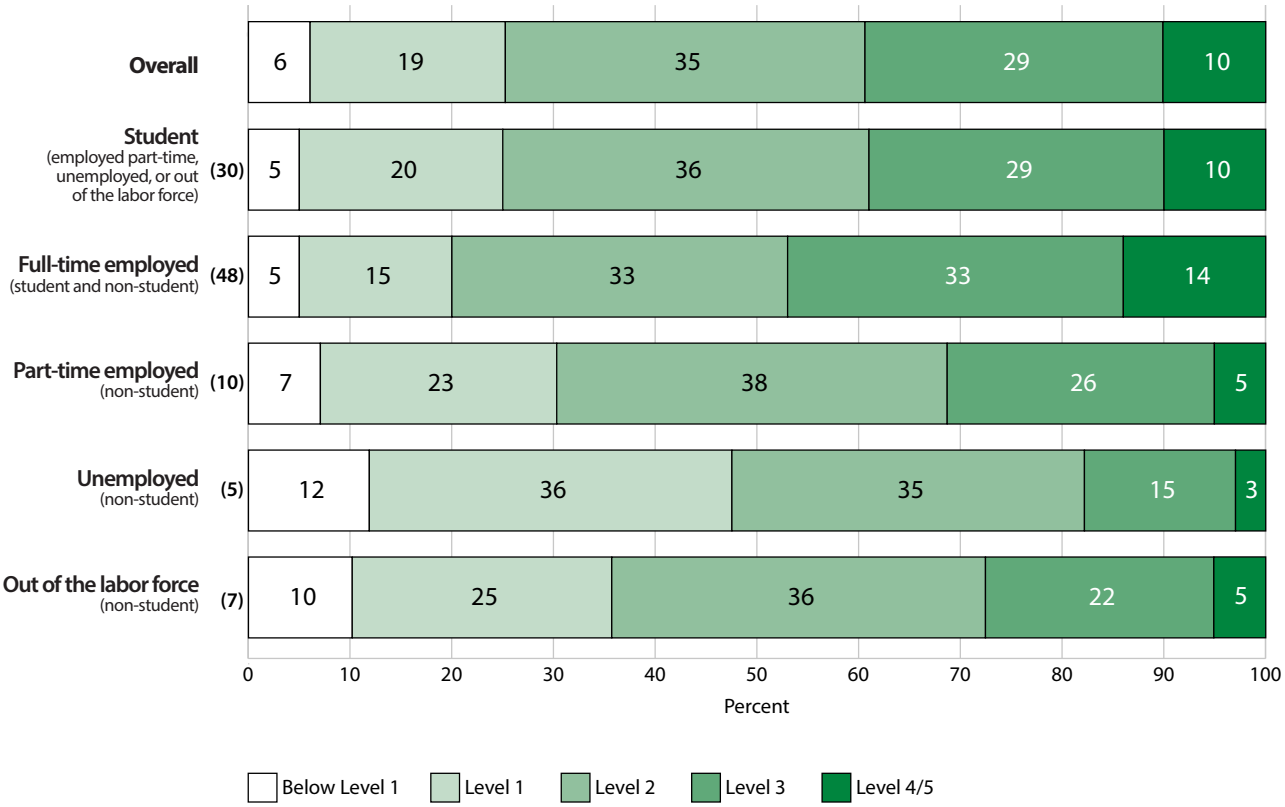


NOTE: Population percentages of U.S. adults age 16 to 34 by current student and employment status appear in parentheses. The population percentage distribution for the problem solving in technology-rich environments scale includes only those adults who took the problem solving in technology-rich environments assessment, which may differ from the percentage distribution for the literacy and numeracy scales. Approximately 8 percent of the U.S. sample chose not to take the assessment on computer or were unable to do so and therefore did not take the problem solving in technology-rich environments assessment. Detail may not sum to totals because of rounding. Apparent differences between estimates may not be statistically significant. See exhibit 3 in this report for more information on how the categories of the student and employment status variable were derived.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Program for the International Assessment of Adult Competencies (PIAAC), U.S. PIAAC 2012/2014; Organization for Economic Cooperation and Development, PIAAC 2012.

FIGURE 4-B.

Percentage of U.S. adults age 16 to 34 at each level of proficiency on the PIAAC numeracy scale, by current student and employment status: 2012 and 2014

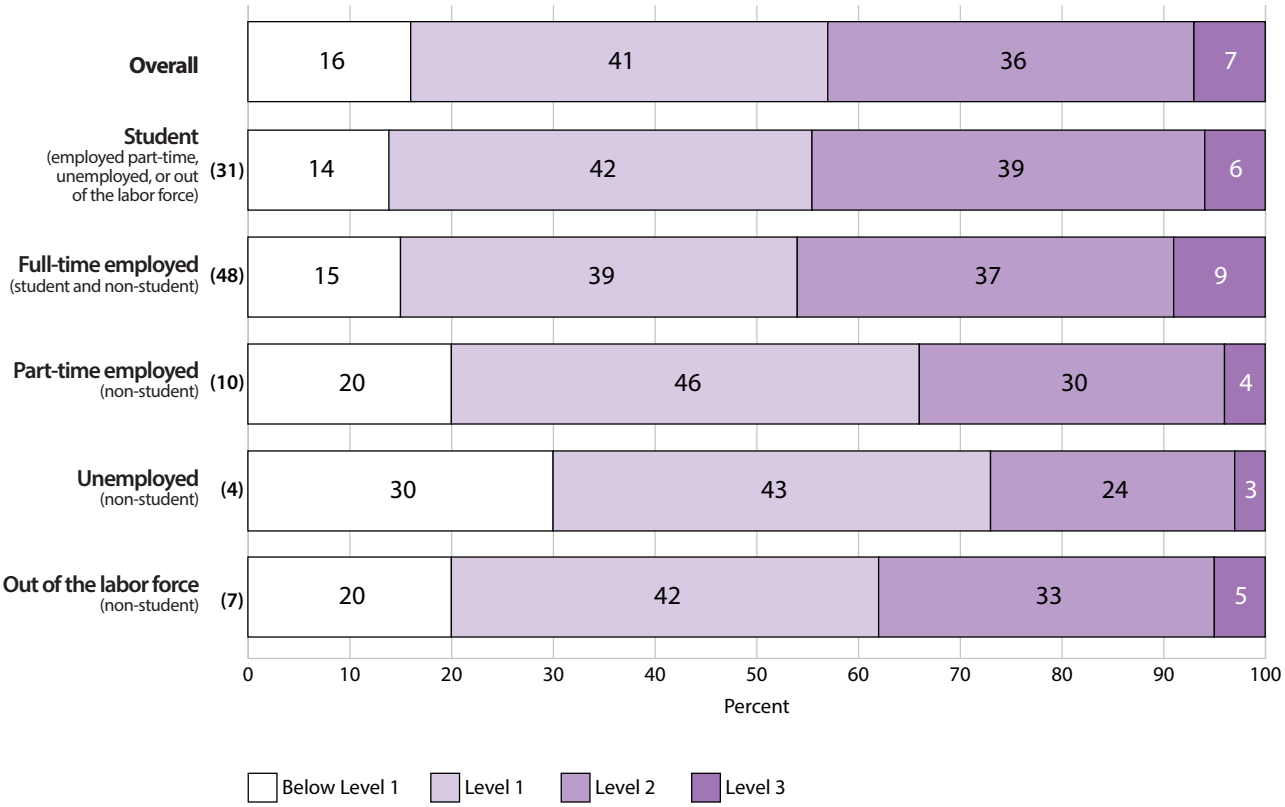


NOTE: Population percentages of U.S. adults age 16 to 34 by current student and employment status appear in parentheses. The population percentage distribution for the problem solving in technology-rich environments scale includes only those adults who took the problem solving in technology-rich environments assessment, which may differ from the percentage distribution for the literacy and numeracy scales. Approximately 8 percent of the U.S. sample chose not to take the assessment on computer or were unable to do so and therefore did not take the problem solving in technology-rich environments assessment. Detail may not sum to totals because of rounding. Apparent differences between estimates may not be statistically significant. See exhibit 3 in this report for more information on how the categories of the student and employment status variable were derived.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Program for the International Assessment of Adult Competencies (PIAAC), U.S. PIAAC 2012/2014; Organization for Economic Cooperation and Development, PIAAC 2012.

FIGURE 4-C.

Percentage of U.S. adults age 16 to 34 at each level of proficiency on the PIAAC problem solving in technology-rich environments (PS-TRE) scale, by current student and employment status: 2012 and 2014



NOTE: Population percentages of U.S. adults age 16 to 34 by current student and employment status appear in parentheses. The population percentage distribution for the problem solving in technology-rich environments scale includes only those adults who took the problem solving in technology-rich environments assessment, which may differ from the percentage distribution for the literacy and numeracy scales. Approximately 8 percent of the U.S. sample chose not to take the assessment on computer or were unable to do so and therefore did not take the problem solving in technology-rich environments assessment. Detail may not sum to totals because of rounding. Apparent differences between estimates may not be statistically significant. See exhibit 3 in this report for more information on how the categories of the student and employment status variable were derived.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Program for the International Assessment of Adult Competencies (PIAAC), U.S. PIAAC 2012/2014; Organization for Economic Cooperation and Development, PIAAC 2012.

Student and employment status by selected demographic characteristics

Table 4 lists those variables that have been selected for a first look at results for the student and employment status variable. Listed are the variable names along with the overall percentage of these subgroups within the total population of adults age 16 to 34, as well as the percentage of each of the variable components (e.g., male, female) across the student and employment status categories. This list is not meant to be exhaustive, although it does represent major demographic groups. As noted above, however, the young adult age group (16-34) restricts the sample size, which limits the ability to report on certain variables that are of interest but that cannot be broken out with the student and employment status variable (e.g., English language learners). Figures in appendix C provide the proficiency level results for the student and employment variable by these selected demographic characteristics. The proficiency level figures for these select demographic characteristics provide an overview of the performance levels for these variables, but are not meant to be exhaustive. Instead, they are meant for researchers as a first look at the data and as a touchstone to compare output with when checking that analyses have been run correctly.

TABLE 4.

Percentage distribution of U.S. adults age 16 to 34, by selected characteristics and current student and employment status: 2012 and 2014

Characteristic	Overall	Current student and employment status				
		Student (employed part-time, unemployed, or out of the labor force)	**Full-time employed** (student and non-student)	**Part-time employed** (non-student)	**Unemployed** (non-student)	**Out of the labor force** (non-student)
Gender						
Male	51	30	53	9	5	4
Female	49	31	42	11	5	10
Race/ethnicity						
White	59	29	49	10	4	7
Black	14	31	44	11	8	6
Hispanic	19	28	48	11	5	7
Other	8	43	41	7	4	5
Nativity						
Born in the United States	88	31	47	11	5	7
Not born in the United States	12	25	55	8	3	9
Parental education						
Neither parent attained high school degree	11	23	49	12	6	11
At least one parent attained high school degree	39	30	47	11	6	8
At least one parent attained college degree	50	32	49	10	3	5
Parenthood						
Have children	35	9	59	14	6	12
Don't have children	65	41	42	8	4	4
Educational attainment						
Below high school	20	61	17	9	5	8
High school credential	49	27	47	12	6	8
Associate degree and above	31	16	69	8	3	5
Participation in non-formal education						
Yes	63	21	60	11	4	4
No	37	21	42	13	8	16
Monthly earnings						
Bottom quintile	29	55	15	30	†	†
Lower-middle quintile	25	11	76	13	†	†
Middle quintile	21	3	92	6	†	†
Upper-middle quintile	16	2	95	3	†	†
Top quintile	9	2	95	2	†	†
Occupational classification						
Skilled occupations	36	17	69	8	2	3
Semi-skilled white-collar occupations	38	36	39	13	5	7
Semi-skilled blue-collar occupations	13	17	65	7	7	4
Elementary occupations	13	37	30	20	8	5
Field of study for highest level of educational attainment						
General programs, Teacher training and education	18	19	59	11	3	8
Humanities, languages and arts; Social sciences, business and law	33	17	65	10	4	5
Science, mathematics and computing; Engineering, manufacturing and construction	26	21	66	6	3	4
Other	23	19	57	13	4	7

† Not applicable.

NOTE: Student includes young adults currently enrolled in formal degree/certificate programs who were not employed full-time but could be working part-time (1–34 hours per week), unemployed, or out of the labor force. Full-time employed includes young adults who were classified as working 34 or more hours per week regardless of whether they were currently enrolled in any formal degree/certificate program. Young adults not currently enrolled in any formal degree/certificate programs were classified as part-time employed if they worked 1–34 hours per week, Unemployed if they were not currently working and were seeking employment, and Out of the labor force if they were not seeking employment.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Program for the International Assessment of Adult Competencies (PIAAC), U.S. PIAAC 2012/2014; Organization for Economic Cooperation and Development, PIAAC 2012.

First look takeaways

A first look at the PIAAC 2012/14 data with the student and employment status variable highlights two critical skill issues for young adults. The first is the extent of the problem of "disconnected youth"—segments of the young adult population that are not engaged in education or the workforce, in this case, the combined categories of unemployed and out of the labor force young adults (OECD, 2013; U.S. Department of Education, 2015; Ross & Svajlenka, 2016). While those not engaged in formal education or employed represent a smaller percentage of young adults than those who are students or employed full-time (12 percent unemployed or out of the labor force versus 78 percent in full-time employed or student, as shown in figure 1), they are nonetheless a sizable absolute number of the young adult population in the United States. PIAAC 2012/14 data indicate about 4 million young adults ages 16 to 24 fall into this category of "disconnected youth," with 9 million in this category when one looks at all young adults ages 16 to 34.

The second critical issue is that young adults who are not studying but are currently looking for work (i.e., unemployed, non-student) have significantly lower skills in numeracy than those who are not studying and not looking for work (i.e., out of the labor force, non-student). In fact, those who are not studying but are looking for work have the highest percentages in the lowest proficiency levels in numeracy. This finding may reflect the efficiency of the education system and the labor market, as it suggests that they both are recruiting young adults most skilled in numeracy. However, this finding also indicates a potential mismatch in skills between education and training and the work requirements of the labor market, as well as the need for training of those actively wanting to be a part of the labor force.

Explore this variable further

Researchers interested in exploring further aspects of the transition of young adults into the labor force can find PIAAC results, information about the assessment, data, and data tools on the NCES website. Specifically, one can

- analyze U.S. PIAAC data with the new student and employment status variable (*EMPSTAT)* in the NCES International Data Explorer (IDE) at http://nces.ed.gov/surveys/international/ide/;
- access PIAAC public-use data files that are available at http://nces.ed.gov/surveys/piaac/datafiles.asp; and
- access PIAAC restricted-use data files that are available to NCES Restricted-use Data Licensees. More information on licenses can be found at http://nces.ed.gov/pubsearch/licenses.asp.

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More Information About PIAAC

This report provides findings for only a few select results. For more PIAAC results and information about the assessment

- preview and print a selection of data on the performance of U.S. adults on the PIAAC assessment for various topics across all three domains at the PIAAC Results Portal https://nces.ed.gov/surveys/piaac/results/makeselections.aspx;
- find more information about the international results at http://www.oecd.org/site/piaac/;
- explore U.S. PIAAC data in the NCES International Data Explorer (IDE) at http://nces.ed.gov/surveys/international/ide/;
- access public-use data files that are available at http://nces.ed.gov/surveys/piaac/datafiles.asp; and
- access restricted-use data files that are available to NCES Restricted-use Data Licensees. More information on licenses can be found at http://nces.ed.gov/pubsearch/licenses.asp.

Appendix A: Methodology and Technical Notes

This appendix briefly describes features of the PIAAC study, with a particular focus on its implementation in the United States. For further details, see the full technical report—*U.S. Program for the International Assessment of Adult Competencies (PIAAC) 2012/2014: Main Study and National Supplement Technical Report*—available at https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2016036REV. Also see *Skills Matter: Further Results from the Survey of Adult Skills* and *The Survey of Adult Skills: Reader's Companion, Second Edition* for a complete description of the PIAAC study. Both are available for download from http://www.oecd.org/skills/piaac/publications.htm.

The United States has conducted two rounds of PIAAC data collections. The first, called the Main Study household data collection, was conducted from August 25, 2011 through April 3, 2012, and the second, called the U.S. National Supplement household data collection, was conducted from August 26, 2013 through May 5, 2014.

Assessment Design

The PIAAC psychometric assessment design is complex because the assessment measures competencies in four domains—literacy, numeracy, reading components, and problem solving in technology-rich environments—across two modes of administration—paper-and-pencil and computer instruments. The design collects information that can be used to analyze the relationship between the measured competencies, PIAAC behavioral measures, and social/economic measures obtained from the responses to the background questions and the job requirements approach module of the assessment.

PIAAC was designed as a computer-based assessment. Respondents who had little or no familiarity with computers, however, were directed to a paper-and-pencil version of the assessment that tested skills in the domains of literacy and numeracy only. Approximately 15 percent of the respondents in the Main Study and 23 percent in the National Supplement were directed to the paper-and-pencil path. Regardless of whether they took the assessment in the computer or paper-and-pencil format, all respondents first took a "Core" test to determine their capacity to undertake the full assessment. Those who were unsuccessful at the Core test were directed to the assessment of reading components, which is all they were asked to complete. Those who succeeded at the Core test proceeded to the full assessment.

See chapter 2 in the U.S. PIAAC Main Study and National Supplement Technical Report for details on the national survey design, and the development of instruments and the background questionnaire.

Scales Scores and Proficiency Levels

A summary of the PIAAC scale scores and proficiency levels can be found in appendix B of the *Skills of U.S. Unemployed, Young, and Older Adults in Sharper Focus: Results from the Program for the International Assessment of Adult Competencies (PIAAC) 2012/2014: First Look* available at https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2016039rev. More complete information on scale scores and proficiency levels in the PIAAC assessment can be found on the OECD PIAAC website at http://www.oecd.org/site/piaac/.

Sampling

For PIAAC, the U.S. household sample was selected on the basis of a four-stage, stratified area sample: (1) primary sampling units (PSUs) consisting of counties or groups of contiguous counties; (2) secondary sampling units (referred to as segments) consisting of area blocks; (3) housing units containing households; and (4) eligible persons within households.

For both the Main Study and the National Supplement household sample, person-level data were collected through a screener, a background questionnaire, and the assessment. The screener instrument was conducted using a computer-assisted personal interviewing system and collected information that included the age and gender of all household members. It determined which household member or members was/were eligible for the study and selected the sample person(s). Of the 26,003 sampled housing units in the combined Main Study and National Supplement household sample, 3,500 were either vacant or not a housing unit, resulting in a sample of 22,503 households. A total of 9,460 households had at least one eligible adult and completed the screener (more than one adult per household could be selected to complete the questionnaire), which was used to select survey respondents. The final screener response rate was 84.7 percent weighted (note that all response rates referenced in this section were computed using base weights for the combined sample). Based on the screener data, 10,668 respondents age 16 to 74 were selected to complete the background questionnaire and the assessment; 8,488 actually completed the background questionnaire. Of the 2,180 respondents who did not complete the background questionnaire, 182 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), a reading or writing difficulty, or a mental disability. The final PIAAC 2012/2014 response rate for the background questionnaire was 80.9 percent weighted. The numerator of the response rate included respondents who completed the background questionnaire and respondents who were unable to complete it because of a literacy-related barrier.

Of the 8,488 adults age 16 to 74 who completed the background questionnaire, 8,341 completed the adult literacy assessment. An additional 26 were unable to complete the assessment for literacy-related reasons. The final PIAAC 2012/2014 response rate for the overall assessment was 98.8 percent weighted. The numerator of the response rate included respondents who answered at least one question on each scale and the 26 respondents who were unable to do so because of a language problem or mental disability.

The overall weighted response rate for the PIAAC 2012/2014 household sample was 67.8 percent.

The final U.S. household reporting sample for PIAAC 2012/2014—including the literacy-related nonrespondents to the background questionnaire—consisted of 8,670 respondents. These 8,670 respondents included the 8,490 respondents who completed the background questionnaire, plus the 180 respondents who were unable to complete the background questionnaire for literacy-related reasons. Of the 8,490 respondents who completed the background questionnaire, 7,760 were age 16 to 65 and 730 were age 66 to 74.

The sample was subject to unit nonresponse from the screener, background questionnaire, assessment (including reading components), and item nonresponse to background questionnaire items. The screener and background questionnaire stages had unit response rates below 85 percent and thus required an analysis of the potential for nonresponse bias according to NCES statistical standards.

See chapter 3 in the U.S. PIAAC Main Study and National Supplement Technical Report for complete details on the sample design.

TABLE A-1.

Weighted response rate for U.S. adults age 16 to 34, by survey component and sample: 2012 and 2014

Component	Main Study (percent)	National Supplement		Main Study and National Supplement Combined (percent)
		Area Sample (percent)	List Sample (percent)	
Screener (household)	86.5	81.4	84.8	84.7
Background questionnaire	85.0	79.1	94.3	82.1
Assessment (without reading component)	99.2	99.0	99.7	99.1
Overall rate (product of component response rates)	72.9	63.7	79.7	68.9

SOURCE: U.S. Department of Education, National Center for Education Statistics, Program for the International Assessment of Adult Competencies (PIAAC), U.S. PIAAC 2012/2014; Organization for Economic Cooperation and Development, PIAAC 2012.

Nonresponse Bias

The nonresponse bias analysis of the household sample revealed differences in the characteristics of respondents who participated in the background questionnaire compared with those who refused. In a bivariate unit-level analysis at the background questionnaire stage, estimated percentages for respondents were compared with those for the total eligible sample to identify any potential bias owing to nonresponse. Multivariate analyses were conducted to further explore the potential for nonresponse bias by identifying the domains with the most differential response rates. The three samples (Main Study, National Supplement area sample, and National Supplement list sample) were analyzed separately to inform the separate nonresponse weighting adjustments for each sample.

For the Main Study, these analyses revealed that the subgroup with the lowest response rates for the background questionnaire had the following characteristics: (1) Hispanic, (2) age 26 and older with no children in the household, and (3) reside outside the Northeastern United States in areas with low levels of linguistic isolation (a low percentage who have some difficulty speaking English) and with unemployment rates exceeding approximately 5 percent. For the National Supplement area sample, the lowest response rates to the background questionnaire were for persons with the following characteristics: (1) age 25 to 34 or older than 55, (2) sampled as not unemployed (age 16 to 34) or older (age 66 to 74), (3) no children in the household, (4) reside in the Northeastern United States in a census tract with an employment rate exceeding approximately 65 percent and in which more than approximately 2 percent of the population is foreign born.

For the National Supplement list sample, the subgroup with the lowest background questionnaire response rates corresponded to the following: (1) female with no children in the household, (2) reside in a Metropolitan Statistical Area in the Western or Northeastern United States, and (3) reside in a census tract in which less than approximately 29 percent of the population has a high school education. In general, persons with children in the household were found to be more likely to participate, as were persons in areas with a high percentage of the population below 150 percent of poverty. However, the variables found to be significant in the multivariate analysis—those used to define areas with low response rates—were used in weighting adjustments in an effort to reduce bias.

See chapter 7 in the U.S. PIAAC Main Study and National Supplement Technical Report for the complete nonresponse bias analysis.

Data Collection

Whenever possible, interviewers administered the background questionnaire and assessment in a private setting (e.g., home or library). Using the computerized interview and assessment software provided by the PIAAC Consortium,[1] the interviewer read the background questionnaire questions from a laptop and entered all responses directly into the laptop. Skip patterns and follow-up probes for contradictory or out-of-range responses were programmed into the interview software. At the completion of the background questionnaire, the participant was administered the computer-based Core test or the paper-and-pencil based Core test if the participant could not or would not use the computer. Upon the completion and scoring of the Core tasks, the respondent was routed to the computer-based assessment (CBA), the paper-based assessment (PBA) of literacy and numeracy, or the paper-based reading components. The background questionnaire and the assessment took approximately 2 hours to complete, however the time varied by the respondent. The number of assessment items also varied based on the respondents' performance on the Core test and the adaptive routing implemented in the automated portion of the assessment.

Progress through the assessment was controlled by the computer based on the respondent's performance on various components of the assessment. The PIAAC assessment was composed of the following components:

- The Core consisted of three modules: the CBA Core Stage 1, the CBA Core Stage 2, and the PBA Core.
    - The CBA Core Stage 1 included six tasks and was designed to determine whether the participant had the basic set of ICT skills needed to complete the computer-based assessment. To pass the CBA Core Stage 1, the participant needed to correctly answer at least three of the first five tasks, plus the sixth task (highlighting text). CBA Core Stage 1 questions were automatically scored by the computer, and a participant who passed the CBA Core Stage 1 continued on to the CBA Core

1 The PIAAC Consortium includes the following organizations: Educational Testing Service (ETS), Westat, cApStAn, the Research Centre for Education and the Labor Market (ROA), gesis-ZUMA Centre for Survey Research, German Institute for International Education Research (DIPF), and the Data Processing Centre of the International Association for the Evaluation of Educational Achievement (IEA). In addition to these organizations, PIAAC is aided by numerous national contracting partners.

Stage 2. A participant who did not pass the CBA Core Stage 1 was routed to the PBA Core.

  - The CBA Core Stage 2 included six tasks that measured basic literacy and numeracy skills necessary to undertake the assessment. CBA Core Stage 2 questions were automatically scored by the computer, and a participant who passed the CBA Core Stage 2 continued on to the computer-based assessment. A participant who did not pass the CBA Core Stage 2 was routed directly to the paper-based reading components section.

  - The PBA Core consisted of eight tasks and measured basic literacy and numeracy skills necessary to undertake the assessment. PBA Core questions were interviewer scored and entered into the computer to determine whether the participant passed the PBA Core. A participant who passed the PBA Core continued on to the paper-based assessment of literacy and numeracy and then to the paper-based reading components section. A participant who did not pass the PBA Core was routed directly to the reading components section.

- The assessment was administered in CBA and PBA modes.

  - The CBA consisted of three "testlets" of tasks at Stage 1 (9 items) and four "testlets" at Stage 2 (11 items). Each respondent completed two testlets that included items from two of the three domains.

  - The PBA consisted of two paper-based assessment booklets, one contained literacy items and one contained numeracy items. Each booklet contained 20 items for the participant to complete and each participant completed only one booklet type.

- The reading components were completed by a participant after completing the literacy or numeracy booklet. Reading components were also completed by a respondent who failed the CBA Core Stage 2 or the PBA Core.

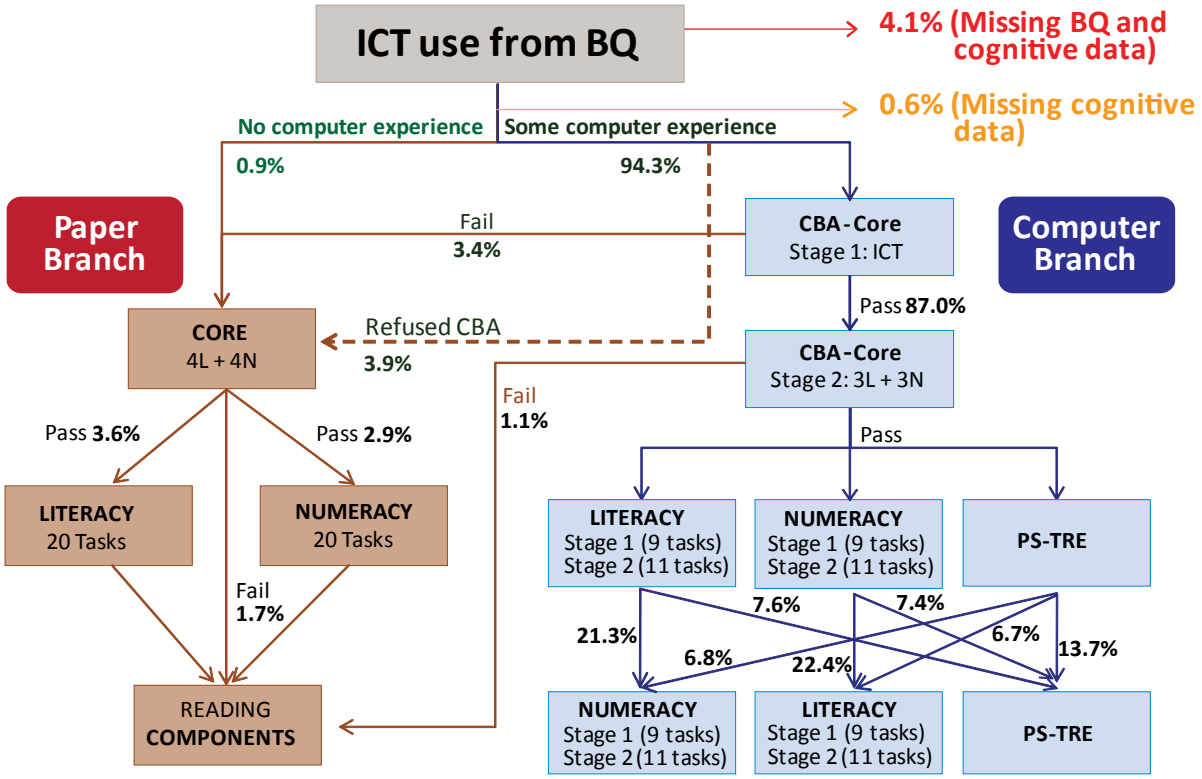
Problem Solving in Technology-Rich Environments: U.S. Sample

The PIAAC assessment design was developed to route respondents to the most appropriate delivery mode as a means to help assure the most reliable, valid, and comparable assessment of skills. The computer-based assessment (CBA) was chosen for those demonstrating information and communication technology (ICT) skills, while the remaining respondents received the paper-based assessment (PBA). The scores for respondents that had no computer experience, failed the ICT skills test, or refused the CBA did not contribute to the estimation of the item parameters for the problem solving in technology-rich environments (PS-TRE) domain. The design of the PIAAC assessment contained only literacy and numeracy in the PBA because the problem solving in technology-rich environments assessment, by definition, was suitable only for respondents familiar with ICT environments. Exhibit A-1 illustrates the different stages of

the assessment administration and the different pathways that respondents could follow based on their responses to questions on ICT use in the background questionnaire (BQ). For each pathway, the weighted percentages of U.S. respondents who followed that pathway are shown. For example, the percentage of U.S. respondents age 16 to 34 who said they had some computer experience and were thus routed to the CBA was 94.3 percent, but the percentage of all U.S. respondents age 16 to 34 who were routed to the CBA and eventually received the literacy and numeracy assessment was 21.3 percent while the percentage who received literacy and PS-TRE was 7.6 percent.

See chapter 5 in the U.S. PIAAC Main Study and National Supplement Technical Report for more details on the data collections.

Exhibit A-1. PIAAC Main Study and National Supplement yield for U.S. adults age 16 to 34: 2012 and 2014



SOURCE: U.S. Department of Education, National Center for Education Statistics, Program for the International Assessment of Adult Competencies (PIAAC), U.S. PIAAC 2012/2014; Organization for Economic Cooperation and Development, PIAAC 2012.

Weighting and Variance Estimation

A dual-frame, complex sample design was used to select assessment respondents. The properties of a sample selected through a complex design could be very different from those of a simple random sample in which every individual in the target population has an equal chance of selection and in which the observations from different sampled individuals can be considered statistically independent of one another. Therefore, the properties of the sample for the complex data collection design were taken into account during the analysis of the data. One way of addressing the properties of the sample design was by using sampling weights to combine the Main Study and National Supplement household samples through a compositing procedure and account for the fact that the probabilities of selection were not identical for all respondents. For the household sample, the sampling weights were further adjusted for nonresponse to the screener and background questionnaire, extreme weights were trimmed, and weights for all respondents calibrated to the U.S. Census Bureau's 2012 American Community Survey population totals for those age 16 to 74. Since literacy-related nonrespondents to the screener, the background questionnaire, and the assessment are similar in proficiency, the weights of the literacy-related nonresponse cases were not adjusted during the screener-level nonresponse adjustment. Instead, the background questionnaire weights for the background questionnaire and assessment literacy-related cases were adjusted to account for the literacy-related screener nonrespondents. This adjustment was necessary primarily to allow the literacy-related background questionnaire and assessment nonrespondents to represent the literacy-related screener nonrespondents in the calibration procedure.

All population and subpopulation characteristics based on the PIAAC data used sampling weights in their estimation. The statistics presented in this report are estimates of group and subgroup performance based on a sample of respondents, rather than the values that could be calculated if every person in the nation answered every question on the instrument. Therefore, it is important to have measures of the degree of uncertainty of the estimates. Accordingly, in addition to providing estimates of percentages of respondents and their average scale scores, this report provides information about the uncertainty of each statistic in the form of standard errors on the U.S. PIAAC website at http://nces.ed.gov/surveys/piaac/results/summary.aspx.

Because the assessment used clustered sampling, conventional formulas for estimating sampling variability (e.g., standard errors) that assume simple random sampling and hence independence of observations would have been inappropriate for this report. For this reason, the PIAAC assessment used a paired jackknife replication approach (sometimes referred to as JK2) to estimate standard errors (Rust & Rao, 1996).

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. Findings from *t*-tests are reported based on a statistical significance. All tests in this report used an alpha level of 0.05.

Appendix B: Construction of the Student and Employment Status Variable

Coding for creating the student and employment status variable

The coding below provides readers with the information they need to create the student and employment status variable for all PIAAC countries, using variables available on public-use files. The first step of the process involves creating a six-category employment status variable (*EMP6CAT*) based on employment status (*CD05*) and hours worked per week (*DQ10*). The second step involves creating an employment and student status variable combining the six-category employment status variable (*EMP6CAT*) and the "currently studying" variable (*BQ02A*).

CODING FOR STEP 1:

EMP6CAT - Employment status (derived, 6 categories)

1 = Employed and work 35 or more hours per week ---------- [*C_D05=1, D_Q10*>=35]
2 = Employed and work 15–34 hours per week ----------[*C_D05*=1, *D_Q10*>=15 & <=34]
3 = Employed and work 1–14 hours per week ---------- [*C_D05*=1, *D_Q10*>=1 & <=14]
4 = Employed and unknown work hours ---------- [*C_D05*=1, *D_Q10*=missing]
5 = Unemployed ----------[*C_D05*=2]
6 = Out of the labor force ---------- [*C_D05*=3]

CODING FOR STEP 2:

EMPSTAT - Student and employment status (derived, 5 categories)

1 = Student (part-time, unemployed, or out of the labor force)-----[*B_Q02A*=1, *EMP_6CAT*=2,3,5,6]
2 = Full-time employed (student or non-student)---------- [*EMP_6CAT*=1]
3 = Part-time employed (non-student)----------[*EMP_6CAT*=2,3]
4 = Unemployed (non-student)---------- [*EMP_6CAT*=5]
5 = Out of the labor force (non-student)----------[*EMP_6CAT*=6]

Sample sizes of the student and employment status variable

The sample sizes by categories highlighted in step 2 of creating the student and employment status variable (*EMPSTAT*) are listed in table B-1 below. The limited number of cases in some of the categories mean that analyses with these categories is limited or not possible. For example, with 327 cases classified as out of the labor force, this category does not have a sufficient number of cases to support an in-depth analysis of, for instance, race/ethnicity by education attainment for young adults (age 16 to 34) in this category.

Considerations in the construction of student and employment status variable

Why not put all students in a single category regardless of their employment status?
This was not done because researchers who wish to focus on students compared with non-students can do so simply with variable *BQ02A*. Instead, all students without full-time employment were grouped together to create an analytical category for young adults whose primary focus can be assumed to be education.

Table B-1.

Number of U.S. adults age 16 to 34 assessed in PIAAC, by the student and employment status variable (EMPSTAT): 2012 and 2014

Student and employment status (*EMPSTAT*) variable and subcategory	U.S. adults age 16 to 34
Student (employed part-time, unemployed, or out of the labor force)	1,287
Part-time employed student	494
Unemployed student	346
Out of the labor force student	447
Full-time employed (student or non-student)	1,490
Full-time employed student	259
Part-time employed (non-student)	405
Unemployed (non-student)	532
Out of the labor force (non-student)	327
Missing	97

SOURCE: U.S. Department of Education, National Center for Education Statistics, Program for the International Assessment of Adult Competencies (PIAAC), U.S. PIAAC 2012/2014; Organization for Economic Cooperation and Development, PIAAC 2012.

Why not break out students into categories of part-time employed students, unemployed students, and students who are out of the labor force?

The current variable is meant to simplify analyses focused on the transition of young adults into the labor force from a labor market perspective. Thus, all young adults who are currently studying for a formal degree or certificate and not working full-time are grouped together as they can be considered to be focused primarily on preparing for their future career and categorized as primarily students in their transition. Researchers who wish to break out different student paths can do so easily by crossing *CD05* with the "currently studying" variable *BQ02A*.

Why not base student status on whether young adults had participated in any formal education or any formal adult education/training in the past 12 months?

This was not done because the standard variable to determine employment status asks about current status and mixing time periods (i.e., mixing data on "current" activity with an activity reported to have occurred at least once in "the past 12 months") creates a host of analytical challenges. (For example, if one expands the time period of studying from "current" to "last 12 months," then how does one categorize a person who was enrolled in a formal education program in the last 12 months but is currently employed full-time and no longer studying?) In order to provide clear results for a wide audience, it was determined that the time frame reference for both a person's educational *and* employment status should be the same. The alternative of using a measure of employment status based on employment in the last 12 months was rejected because such a non-standard measure of employment status makes results less comparable with published PIAAC results in national and international reports.

Why not include non-formal education in the definition of being a student?

Although non-formal education and degree programs can share common methods of providing instruction, such as distance learning and taking seminars, studying for a formal degree is still considered the definition of being a student as it implies a considerable commitment to an educational activity. Also, the question in PIAAC only asks about non-formal participation in the last 12 months; therefore, the addition of non-formal education would create an issue with the time reference, as explained above.

Why not use the variable CQ07 (self-reported status) for employment status instead of CD05 (system-derived status)?

This was not done because, although *CQ07* is more detailed, it captures the person's own perception of their main activity at present. This may differ from the stricter system-derived current employment status variable (*CD05*), commonly used to define employment status in NCES and OECD reports. The system-derived current employment status (*CD05*) bases its derivation on the International Labor Organization's (ILO) definition of currently active population (with a reference period of one week). The variable (*CD05*) is derived using respondents' answers to five questions in the beginning of the labor force status section of the background questionnaire. The "employed" category consist of those who participated in paid employment or were self-employed. The "unemployed" category consists of those who were without work, were currently available for work, and were seeking work.[1] The "out of the labor force" category consists of those who were without work and were not seeking work. Meanwhile, in the *CQ07* variable the respondents are asked to mark one of the statements best describing one's current situation; if more than one statement is applicable, the respondents are asked to indicate the statement that best describe how they see themselves. The self-perception of the main activity (*CQ07*) differs from results for the system-derived current employment variable (*CD05*), at times significantly (see table B-2). For example, 101 cases of young adults who see themselves as "unemployed" actually reported participating in activities to meet the PIAAC-ILO definition of currently employed. Conversely, 137 cases of young adults who report themselves as "unemployed" were classified as out of the labor force by the PIAAC-ILO definition based on the activities they participate in.

Table B-2.

Number of U.S. adults age 16 to 34 assessed in PIAAC, by current status/work history—employment status (derived) (CD05) and current situation—self reported (CQ07): 2012 and 2014

Current situation - self reported (*CQ07*)	Employment status (*CD05*)		
	Employed	Unemployed	Out of the labor force
Full-time employed (self-employed, employee)	1,382	12	8
Part-time employed (self-employed, employee)	482	23	12
Unemployed	101	483	137
Pupil, student	301	265	437

SOURCE: U.S. Department of Education, National Center for Education Statistics, Program for the International Assessment of Adult Competencies (PIAAC), U.S. PIAAC 2012/2014; Organization for Economic Cooperation and Development, PIAAC 2012.

[1] For more details, see p. 41 of the Background Questionnaire Framework found at http://www.oecd.org/edu/48865373.pdf and the Background questionnaire found at https://nces.ed.gov/surveys/piaac/final_en_bq.htm.

Why not use the EDWORK or NEET variables to study the young adult population?
Although useful, these variables describe the status of young adults from a perspective that prioritizes education and training. They do not provide detailed information on the intensity of labor force participation (if full- or part-time employed) and have no standard definition of education (including all formal education, formal training, and non-formal training) or time reference (currently studying or studying in the last 12 months for those who are not currently studying or working). *EDWORK* categories distinguish between those who are currently studying and not working; currently studying and working; and not currently studying, but are working. The variable also has two categories that include information on non-formal education activities in the last 12 months for those who are neither studying nor working in the present: not in education or work but has participated in education or training in last 12 months; not in education or work and has not participated in education or training in last 12 months (*NEET*). The *NEET* variable is a binary variable that flags the last category of the *EDWORK* variable for the researchers wishing to study that particular segment of the population. As seen from table B-3, the *EMPSTAT* variable provides additional information on the activities of the young adults with regard to the labor market, while keeping the time reference consistently in terms of the present—for example, whether they are currently looking for work (unemployed) or not (out of the labor force) while not currently studying or working.

Table B-3.

Percentage of U.S. adults age 16 to 34 assessed in PIAAC, by student and employment status (EMPSTAT) and work and education status derived variable (EDWORK): 2012 and 2014

Work and education status (*EDWORK*)	Student and employment status (*EMPSTAT*)									
	Students (part-time, unemployed, or out of the labor force)		Full-time employed (student or non-student)		Part-time employed (non-student)		Unemployed (non-student)		Out of the labor force (non-student)	
In education only	100	(†)	†	(†)	†	(†)	†	(†)	†	(†)
In education and work	63	(2.3)	37	(2.3)	†	(†)	†	(†)	†	(†)
In work only	†	(†)	79	(1.2)	21	(1.2)	†	(†)	†	(†)
Not in education or work but has participated in education or training in last 12 months	†	(†)	†	(†)	†	(†)	49	(3.6)	51	(3.6)
Not in education or work and has not participated in education or training in last 12 months (*NEET*)	†	(†)	†	(†)	†	(†)	32	(3.2)	68	(3.2)

† Not applicable.
NOTE: Standard errors are in parentheses. Detail may not sum to totals because of rounding.

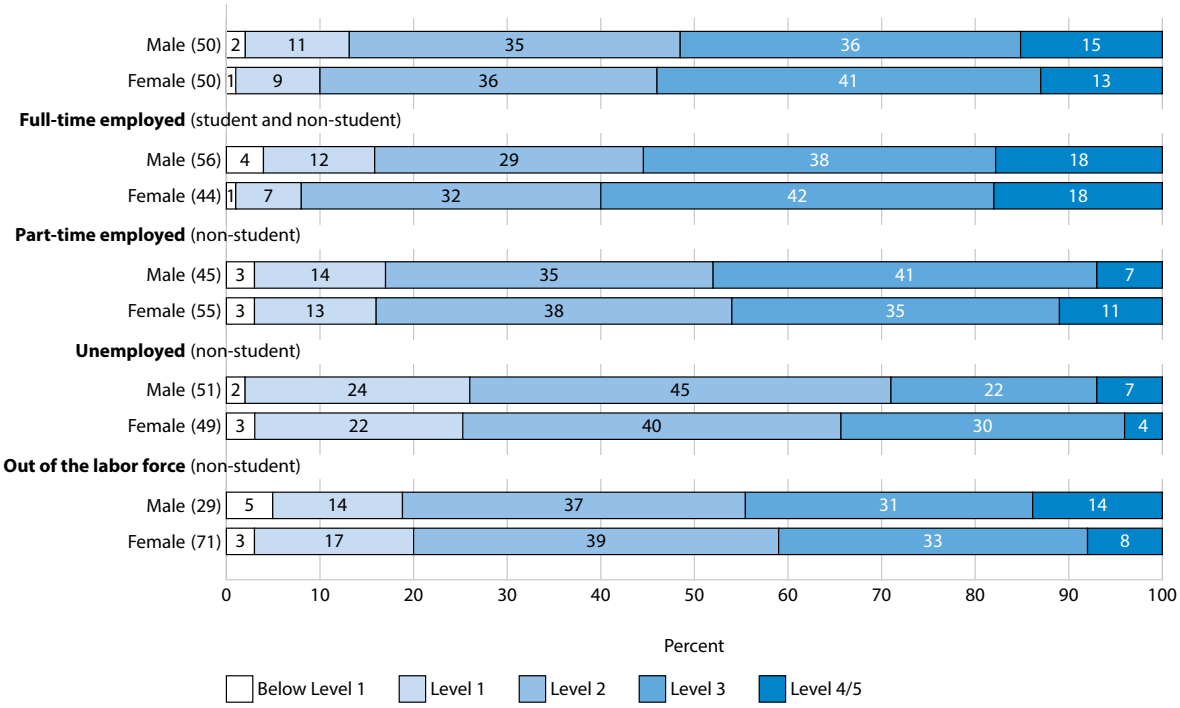
SOURCE: U.S. Department of Education, National Center for Education Statistics, Program for the International Assessment of Adult Competencies (PIAAC), U.S. PIAAC 2012/2014; Organization for Economic Cooperation and Development, PIAAC 2012.

Appendix C: Proficiency Level Results for the Student and Employment Status Variable by Selected Demographic Characteristics

Literacy

FIGURE C-1-A.

Percentage of U.S. adults age 16 to 34 at each level of proficiency on the PIAAC literacy scale, by current student and employment status and gender: 2012 and 2014

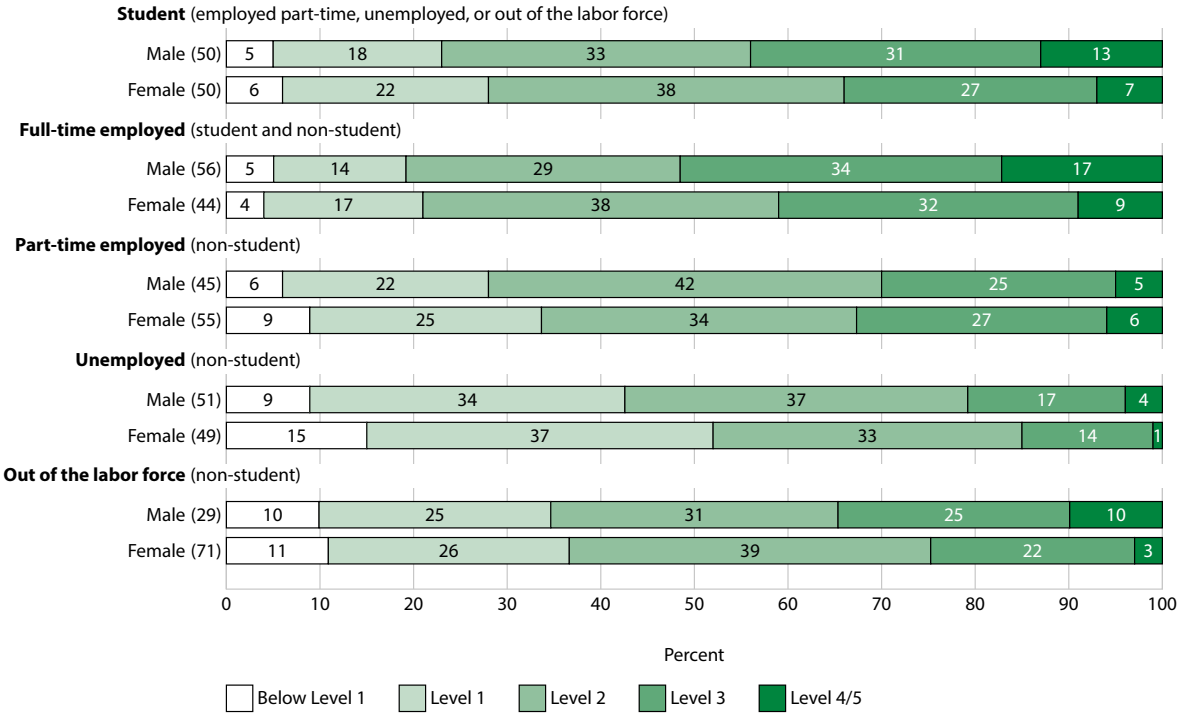


NOTE: Population percentages of U.S. adults age 16 to 34 by current student and employment status and gender appear in parentheses. The population percentage distribution for the problem solving in technology-rich environments scale includes only those adults who took the problem solving in technology-rich environments assessment, which may differ from the percentage distribution for the literacy and numeracy scales. Approximately 8 percent of the U.S. sample chose not to take the assessment on computer or were unable to do so and therefore did not take the problem solving in technology-rich environments assessment. Detail may not sum to totals because of rounding. Apparent differences between estimates may not be statistically significant.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Program for the International Assessment of Adult Competencies (PIAAC), U.S. PIAAC 2012/2014; Organization for Economic Cooperation and Development, PIAAC 2012.

FIGURE C-1-B.

Percentage of U.S. adults age 16 to 34 at each level of proficiency on the PIAAC numeracy scale, by current student and employment status and gender: 2012 and 2014

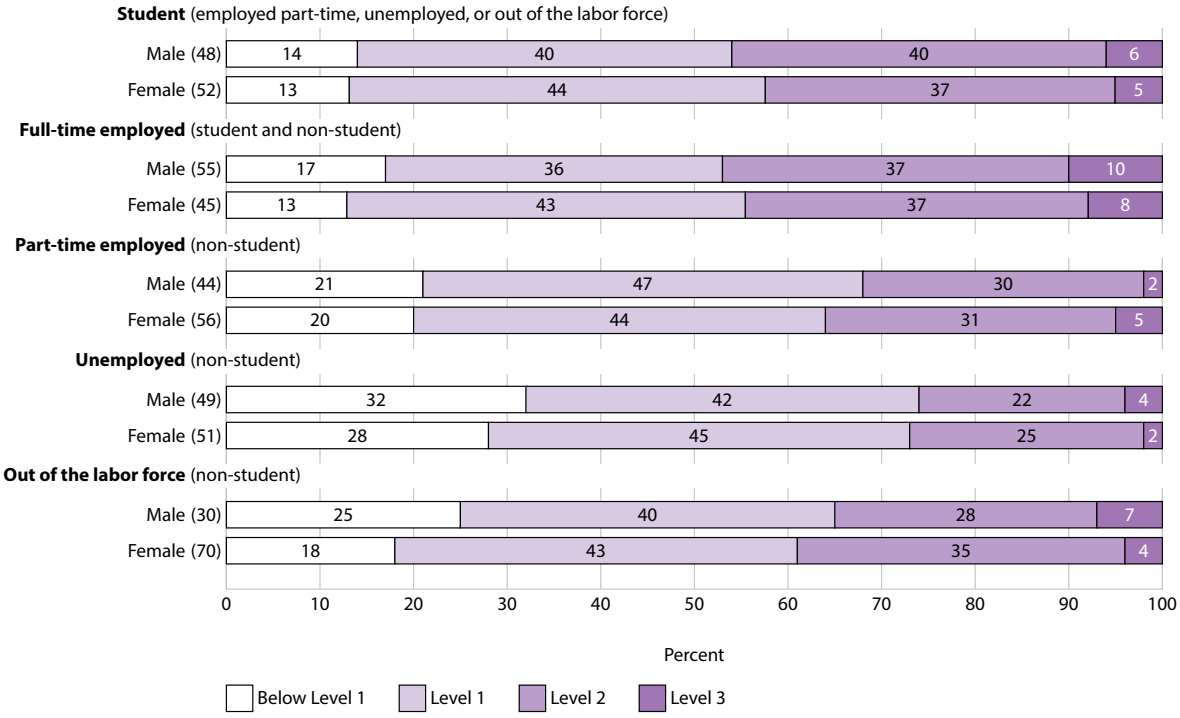


NOTE: Population percentages of U.S. adults age 16 to 34 by current student and employment status and gender appear in parentheses. The population percentage distribution for the problem solving in technology-rich environments scale includes only those adults who took the problem solving in technology-rich environments assessment, which may differ from the percentage distribution for the literacy and numeracy scales. Approximately 8 percent of the U.S. sample chose not to take the assessment on computer or were unable to do so and therefore did not take the problem solving in technology-rich environments assessment. Detail may not sum to totals because of rounding. Apparent differences between estimates may not be statistically significant.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Program for the International Assessment of Adult Competencies (PIAAC), U.S. PIAAC 2012/2014; Organization for Economic Cooperation and Development, PIAAC 2012.

FIGURE C-1-C.

Percentage of U.S. adults age 16 to 34 at each level of proficiency on the PIAAC problem solving in technology-rich environments (PS-TRE) scale, by current student and employment status and gender: 2012 and 2014

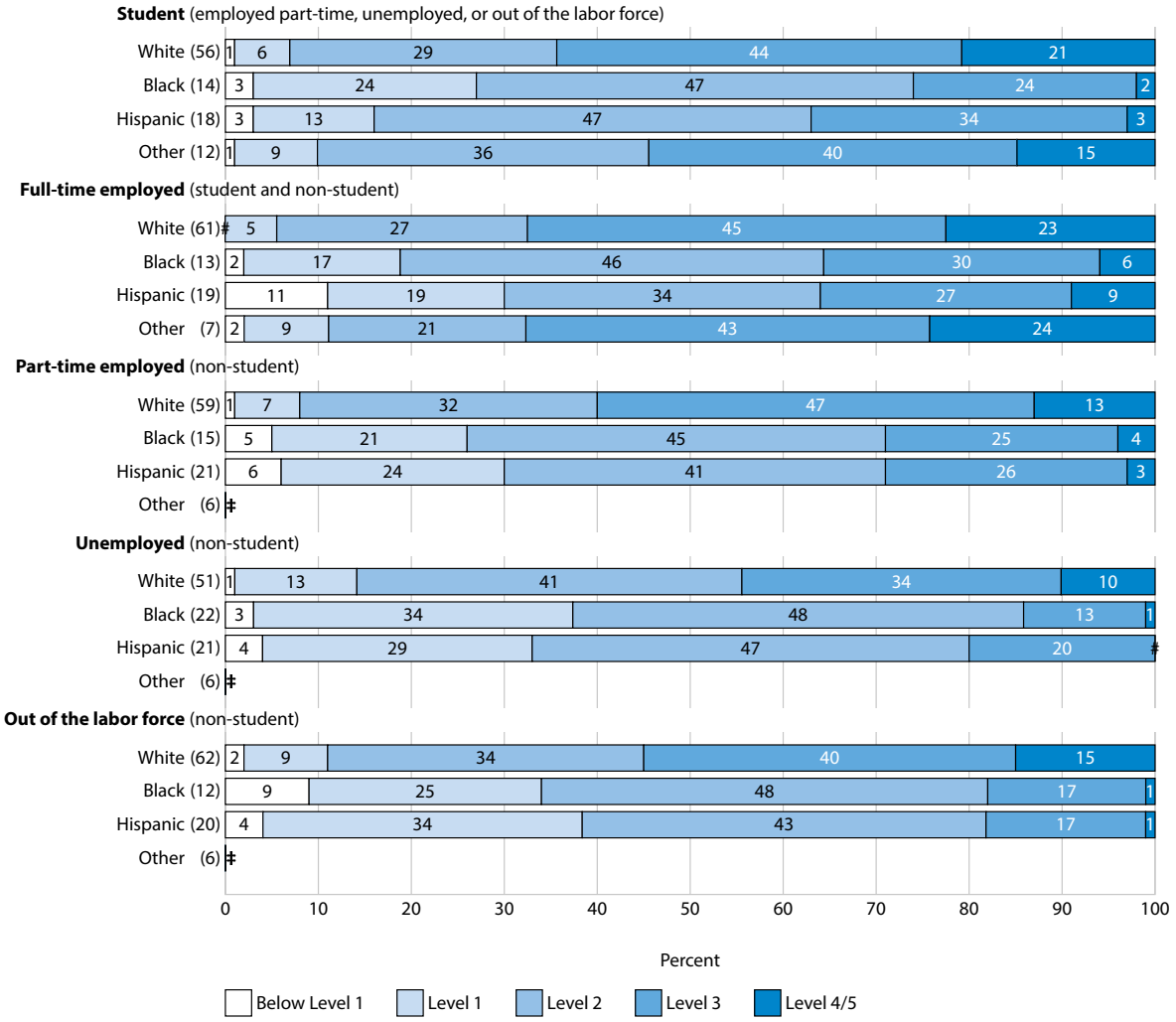


NOTE: Population percentages of U.S. adults age 16 to 34 by current student and employment status and gender appear in parentheses. The population percentage distribution for the problem solving in technology-rich environments scale includes only those adults who took the problem solving in technology-rich environments assessment, which may differ from the percentage distribution for the literacy and numeracy scales. Approximately 8 percent of the U.S. sample chose not to take the assessment on computer or were unable to do so and therefore did not take the problem solving in technology-rich environments assessment. Detail may not sum to totals because of rounding. Apparent differences between estimates may not be statistically significant.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Program for the International Assessment of Adult Competencies (PIAAC), U.S. PIAAC 2012/2014; Organization for Economic Cooperation and Development, PIAAC 2012.

FIGURE C-2-A.

Percentage of U.S. adults age 16 to 34 at each level of proficiency on the PIAAC literacy scale, by current student and employment status and race/ethnicity: 2012 and 2014



Rounds to zero.

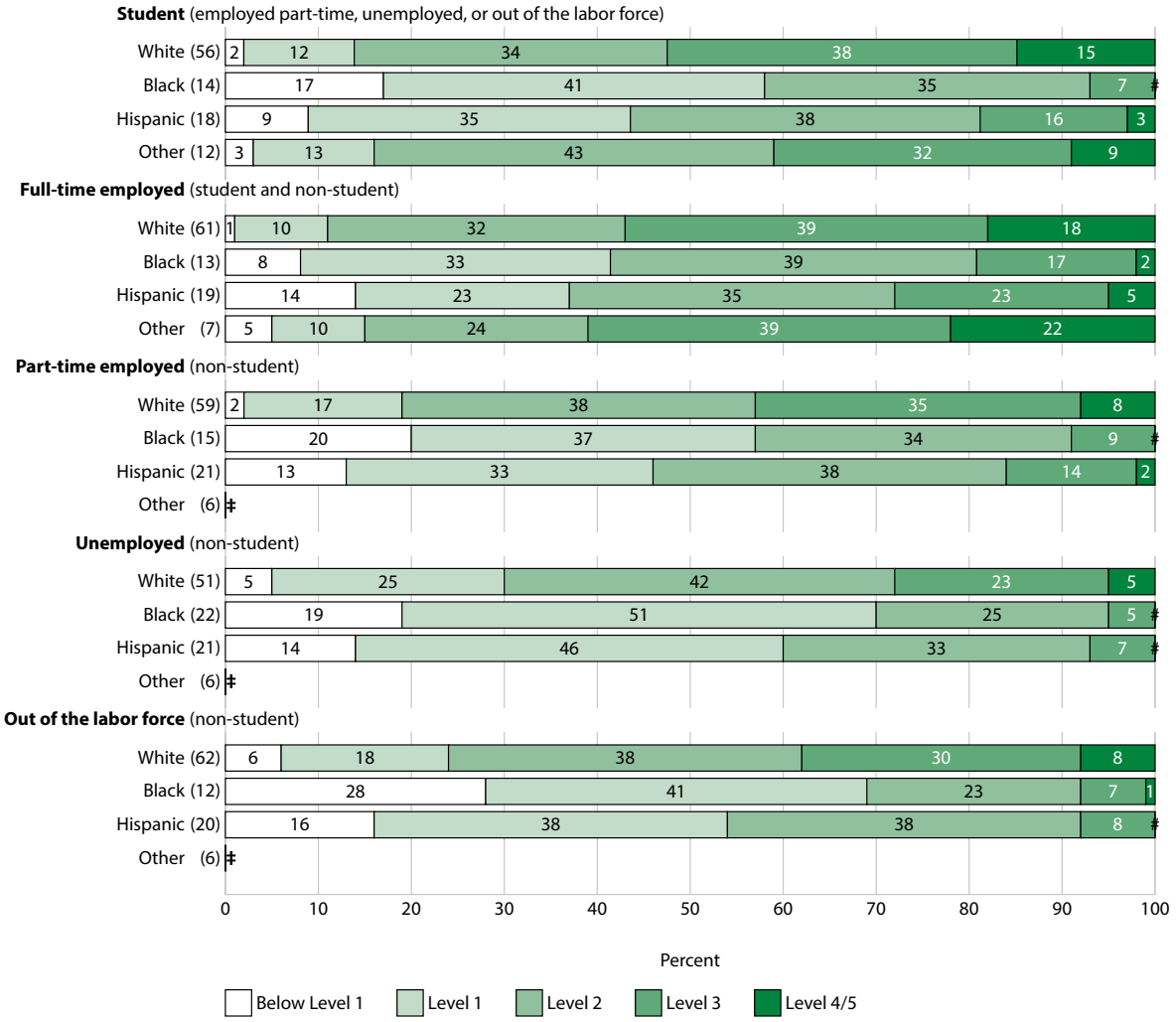
‡ Reporting standards not met.

NOTE: Population percentages of U.S. adults age 16 to 34 by current student and employment status and race/ethnicity appear in parentheses. The population percentage distribution for the problem solving in technology-rich environments scale includes only those adults who took the problem solving in technology-rich environments assessment, which may differ from the percentage distribution for the literacy and numeracy scales. Approximately 8 percent of the U.S. sample chose not to take the assessment on computer or were unable to do so and therefore did not take the problem solving in technology-rich environments assessment. Detail may not sum to totals because of rounding. Apparent differences between estimates may not be statistically significant. Some population groups did not have enough sample size to meet the minimum reporting standards.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Program for the International Assessment of Adult Competencies (PIAAC), U.S. PIAAC 2012/2014; Organization for Economic Cooperation and Development, PIAAC 2012.

FIGURE C-2-B.

Percentage of U.S. adults age 16 to 34 at each level of proficiency on the PIAAC numeracy scale, by current student and employment status and race/ethnicity: 2012 and 2014



Rounds to zero.

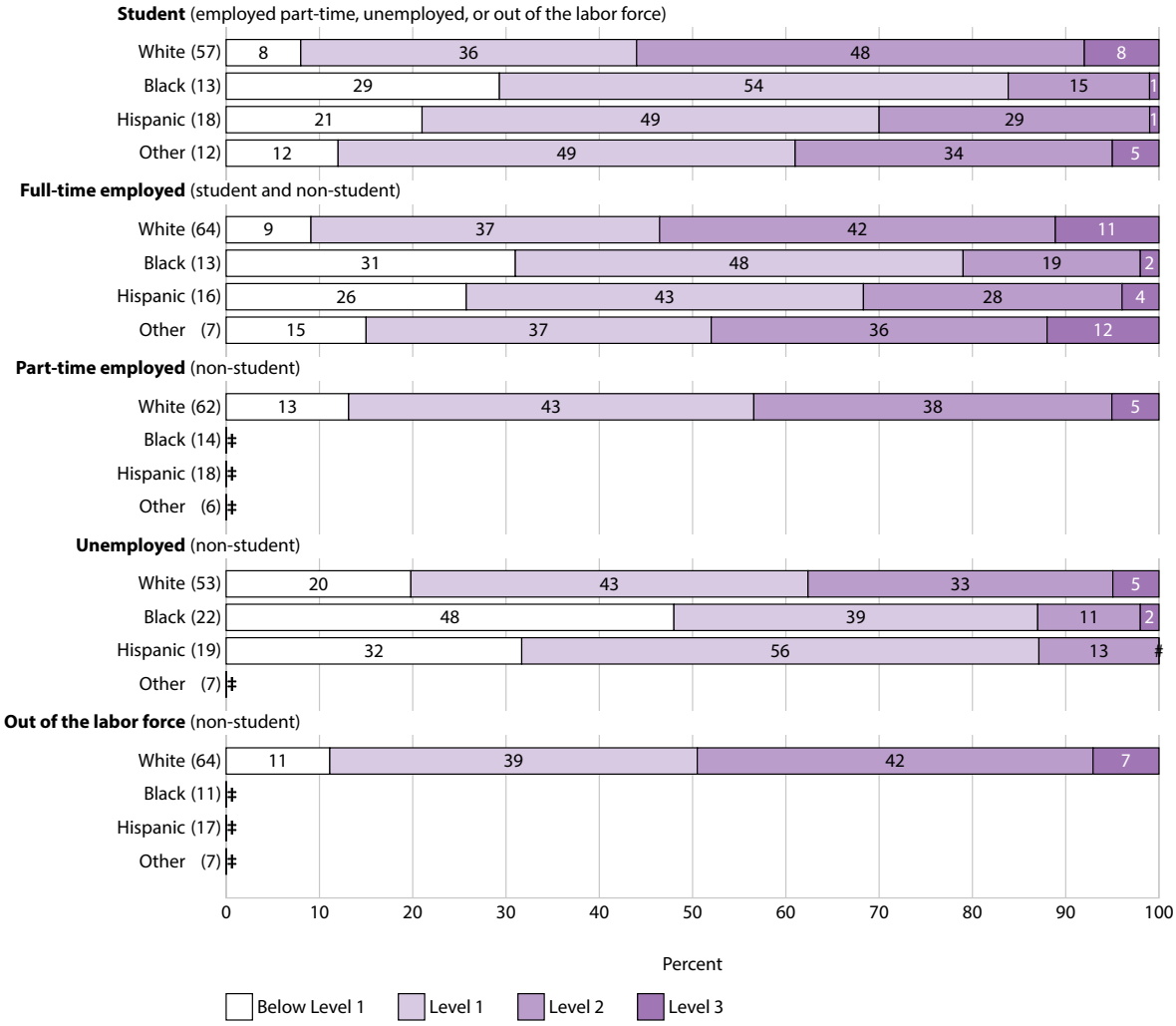
‡ Reporting standards not met.

NOTE: Population percentages of U.S. adults age 16 to 34 by current student and employment status and race/ethnicity appear in parentheses. The population percentage distribution for the problem solving in technology-rich environments scale includes only those adults who took the problem solving in technology-rich environments assessment, which may differ from the percentage distribution for the literacy and numeracy scales. Approximately 8 percent of the U.S. sample chose not to take the assessment on computer or were unable to do so and therefore did not take the problem solving in technology-rich environments assessment. Detail may not sum to totals because of rounding. Apparent differences between estimates may not be statistically significant. Some population groups did not have enough sample size to meet the minimum reporting standards.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Program for the International Assessment of Adult Competencies (PIAAC), U.S. PIAAC 2012/2014; Organization for Economic Cooperation and Development, PIAAC 2012.

FIGURE C-2-C.

Percentage of U.S. adults age 16 to 34 at each level of proficiency on the PIAAC problem solving in technology-rich environments (PS-TRE) scale, by current student and employment status and race/ethnicity: 2012 and 2014



Rounds to zero.

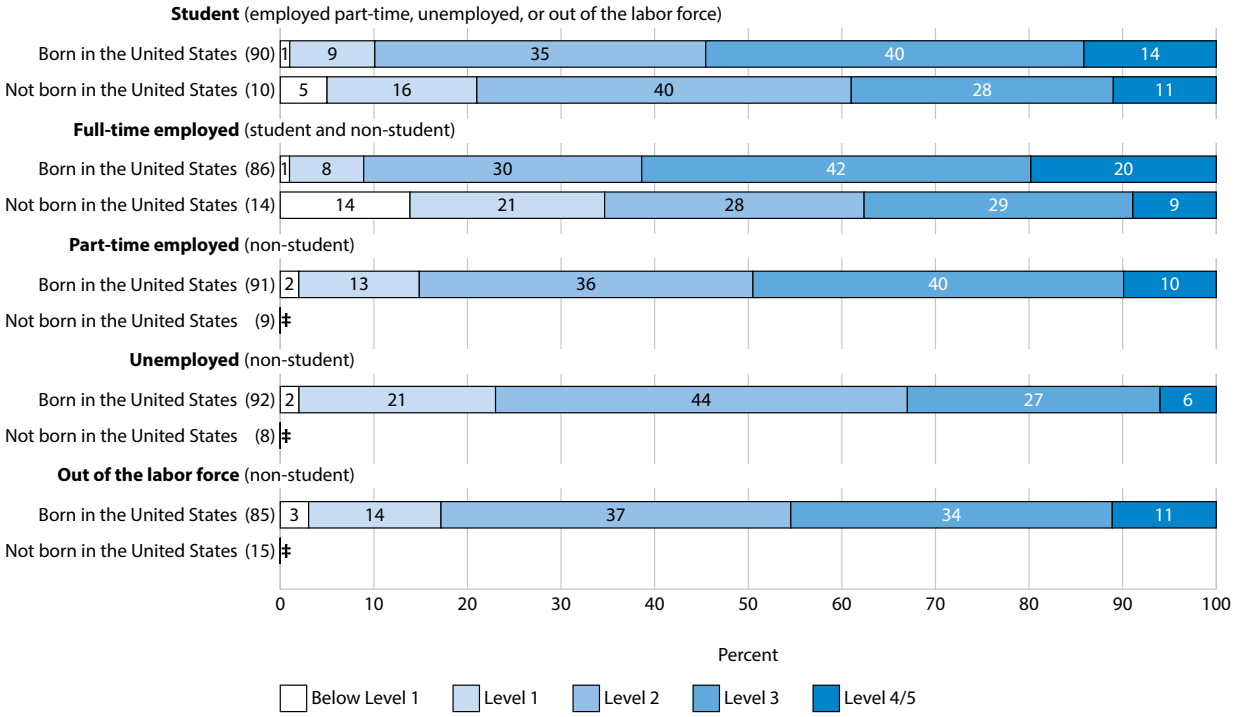
‡ Reporting standards not met.

NOTE: Population percentages of U.S. adults age 16 to 34 by current student and employment status and race/ethnicity appear in parentheses. The population percentage distribution for the problem solving in technology-rich environments scale includes only those adults who took the problem solving in technology-rich environments assessment, which may differ from the percentage distribution for the literacy and numeracy scales. Approximately 8 percent of the U.S. sample chose not to take the assessment on computer or were unable to do so and therefore did not take the problem solving in technology-rich environments assessment. Detail may not sum to totals because of rounding. Apparent differences between estimates may not be statistically significant. Some population groups did not have enough sample size to meet the minimum reporting standards.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Program for the International Assessment of Adult Competencies (PIAAC), U.S. PIAAC 2012/2014; Organization for Economic Cooperation and Development, PIAAC 2012.

FIGURE C-3-A.

Percentage of U.S. adults age 16 to 34 at each level of proficiency on the PIAAC literacy scale, by current student and employment status and whether they were born in the United States: 2012 and 2014



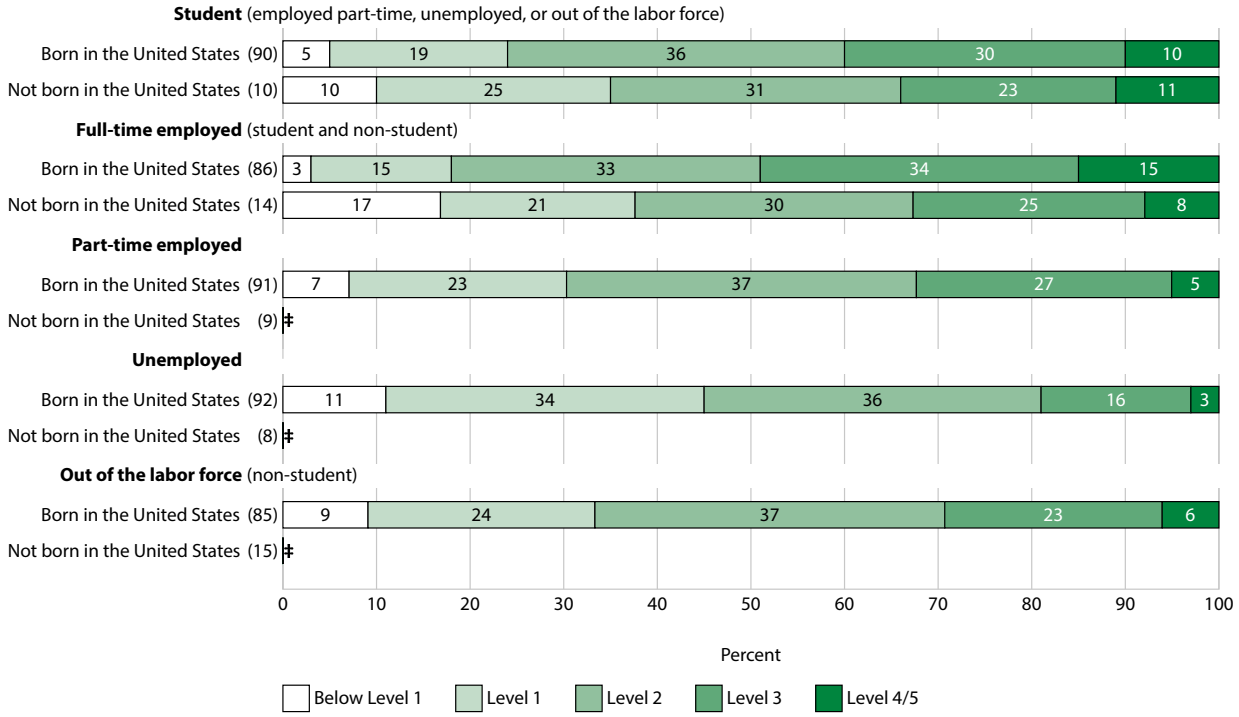
‡ Reporting standards not met.

NOTE: Populaton percentages of U.S. adults age 16 to 34 by current student and employment status and whether they were born in the United States appear in parentheses. The population percentage distribution for the problem solving in technology-rich environments scale includes only those adults who took the problem solving in technology-rich environments assessment, which may differ from the percentage distribution for the literacy and numeracy scales. Approximately 8 percent of the U.S. sample chose not to take the assessment on computer or were unable to do so and therefore did not take the problem solving in technology-rich environments assessment. Detail may not sum to totals because of rounding. Apparent differences between estimates may not be statistically significant. Some population groups did not have enough sample size to meet the minimum reporting standards.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Program for the International Assessment of Adult Competencies (PIAAC), U.S. PIAAC 2012/2014; Organization for Economic Cooperation and Development, PIAAC 2012.

FIGURE C-3-B.

Percentage of U.S. adults age 16 to 34 at each level of proficiency on the PIAAC numeracy scale, by current student and employment status and whether they were born in the United States: 2012 and 2014



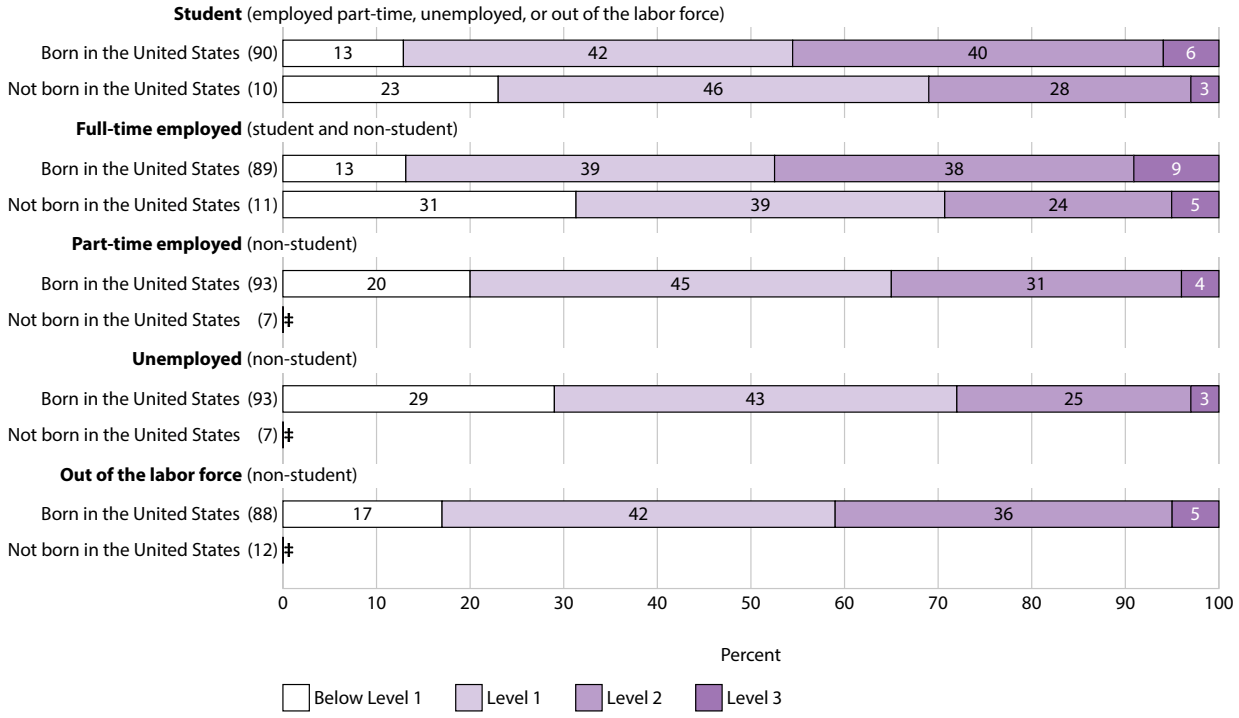
‡ Reporting standards not met.

NOTE: Populaton percentages of U.S. adults age 16 to 34 by current student and employment status and whether they were born in the United States appear in parentheses. The population percentage distribution for the problem solving in technology-rich environments scale includes only those adults who took the problem solving in technology-rich environments assessment, which may differ from the percentage distribution for the literacy and numeracy scales. Approximately 8 percent of the U.S. sample chose not to take the assessment on computer or were unable to do so and therefore did not take the problem solving in technology-rich environments assessment. Detail may not sum to totals because of rounding. Apparent differences between estimates may not be statistically significant. Some population groups did not have enough sample size to meet the minimum reporting standards.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Program for the International Assessment of Adult Competencies (PIAAC), U.S. PIAAC 2012/2014; Organization for Economic Cooperation and Development, PIAAC 2012.

FIGURE C-3-C.

Percentage of U.S. adults age 16 to 34 at each level of proficiency on the PIAAC problem solving in technology-rich environments (PS-TRE) scale, by current student and employment status and whether they were born in the United States: 2012 and 2014



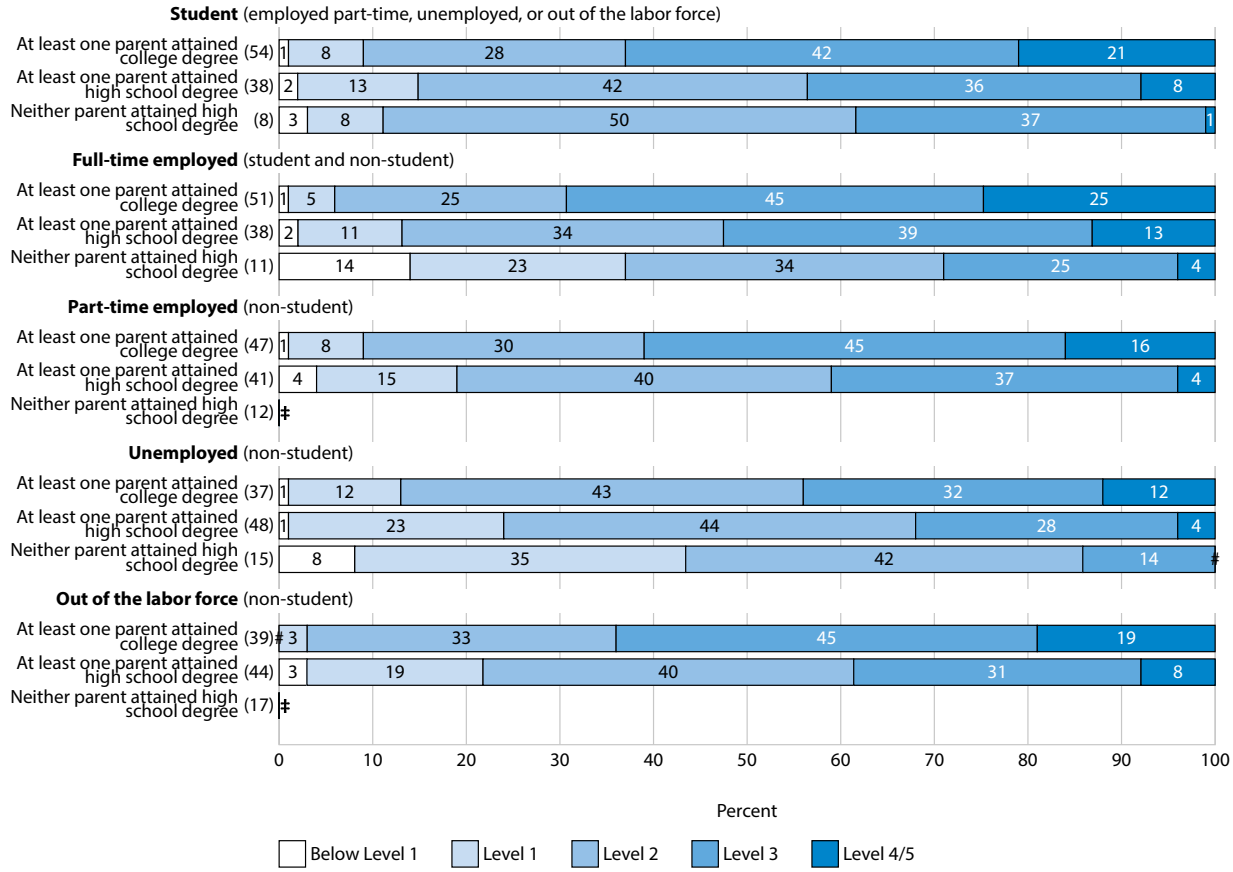
‡ Reporting standards not met.

NOTE: Populaton percentages of U.S. adults age 16 to 34 by current student and employment status and whether they were born in the United States appear in parentheses. The population percentage distribution for the problem solving in technology-rich environments scale includes only those adults who took the problem solving in technology-rich environments assessment, which may differ from the percentage distribution for the literacy and numeracy scales. Approximately 8 percent of the U.S. sample chose not to take the assessment on computer or were unable to do so and therefore did not take the problem solving in technology-rich environments assessment. Detail may not sum to totals because of rounding. Apparent differences between estimates may not be statistically significant. Some population groups did not have enough sample size to meet the minimum reporting standards.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Program for the International Assessment of Adult Competencies (PIAAC), U.S. PIAAC 2012/2014; Organization for Economic Cooperation and Development, PIAAC 2012.

FIGURE C-4-A.

Percentage of U.S. adults age 16 to 34 at each level of proficiency on the PIAAC literacy scale, by current student and employment status and highest level of parental education: 2012 and 2014



Rounds to zero.

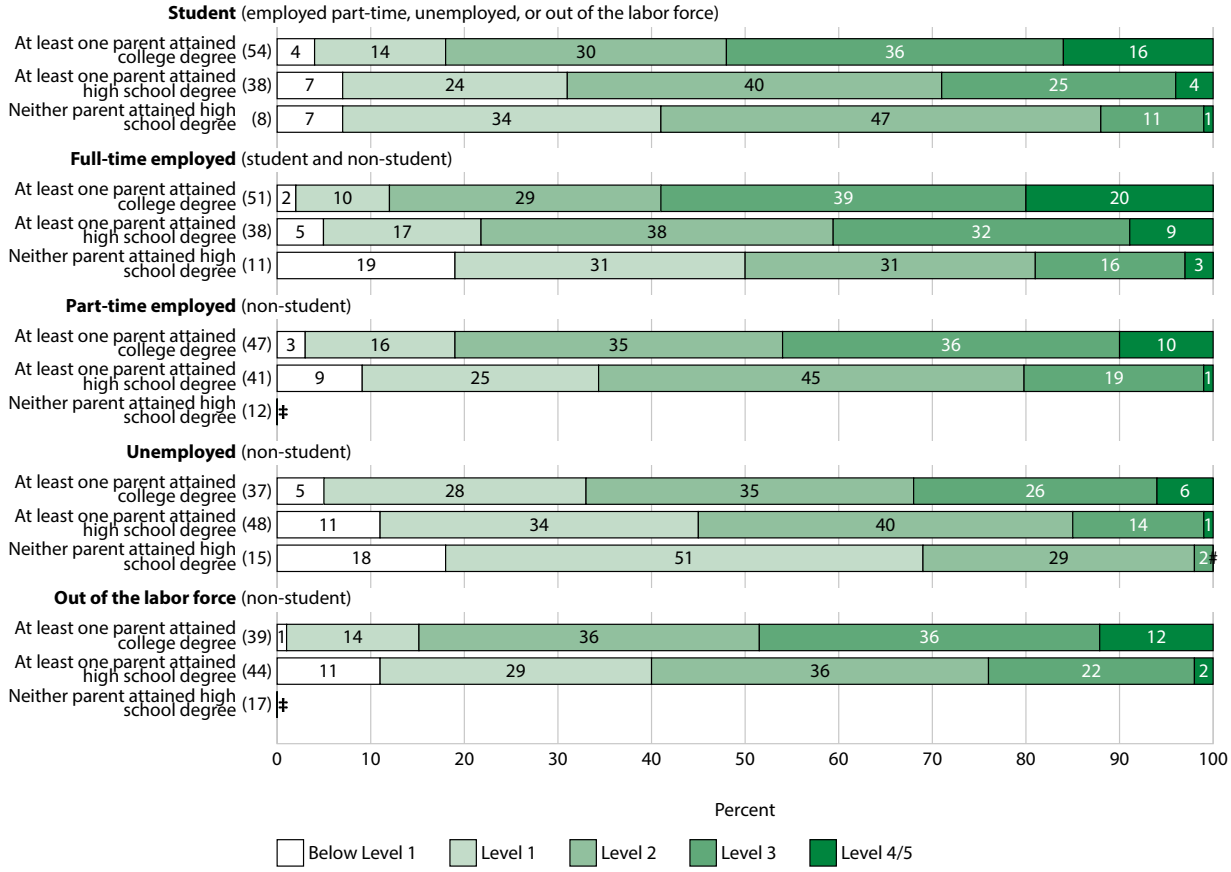
‡ Reporting standards not met.

NOTE: Population percentages of U.S. adults age 16 to 34 by current student and employment status and highest level of parental education appear in parentheses. The population percentage distribution for the problem solving in technology-rich environments scale includes only those adults who took the problem solving in technology-rich environments assessment, which may differ from the percentage distribution for the literacy and numeracy scales. Approximately 8 percent of the U.S. sample chose not to take the assessment on computer or were unable to do so and therefore did not take the problem solving in technology-rich environments assessment. Detail may not sum to totals because of rounding. Apparent differences between estimates may not be statistically significant. Some population groups did not have enough sample size to meet the minimum reporting standards.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Program for the International Assessment of Adult Competencies (PIAAC), U.S. PIAAC 2012/2014; Organization for Economic Cooperation and Development, PIAAC 2012.

FIGURE C-4-B.

Percentage of U.S. adults age 16 to 34 at each level of proficiency on the PIAAC numeracy scale, by current student and employment status and highest level of parental education: 2012 and 2014



Rounds to zero.

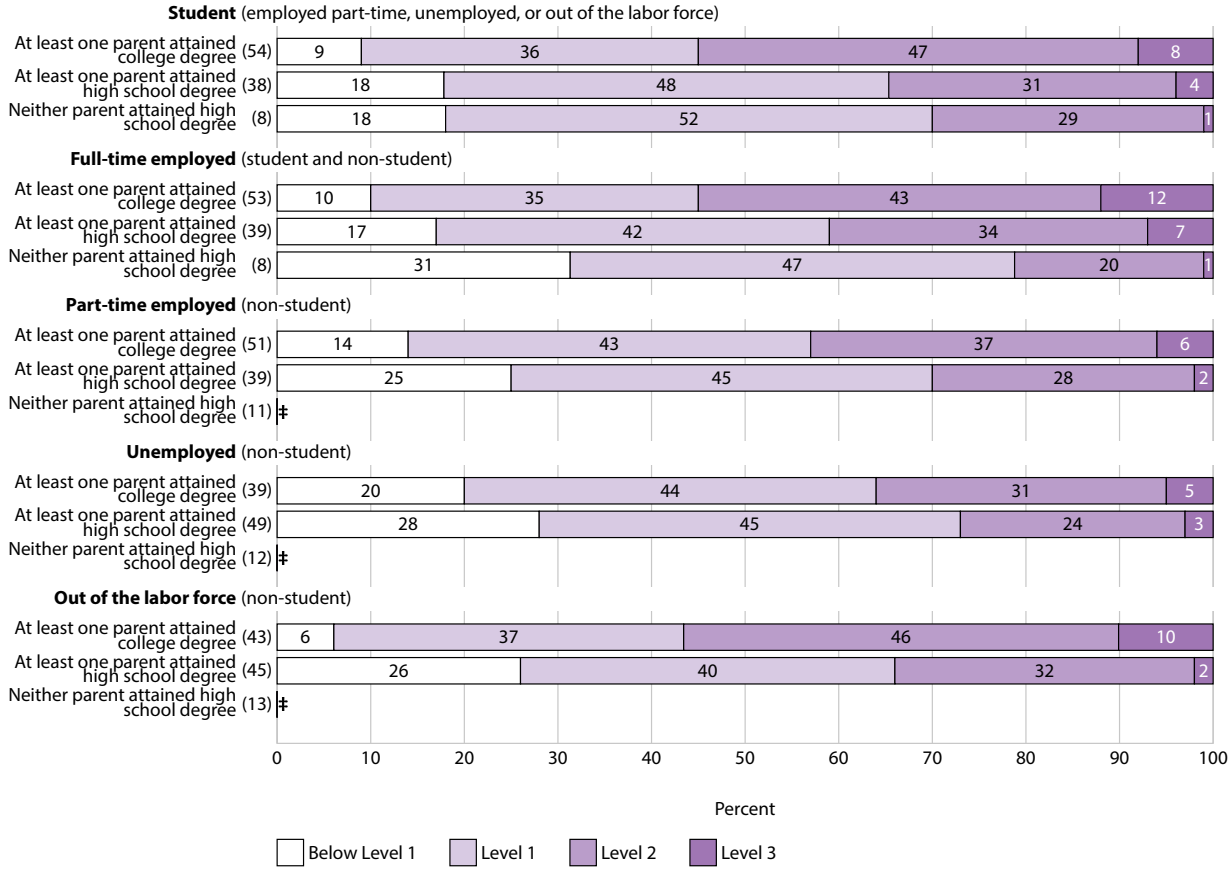
‡ Reporting standards not met.

NOTE: Population percentages of U.S. adults age 16 to 34 by current student and employment status and highest level of parental education appear in parentheses. The population percentage distribution for the problem solving in technology-rich environments scale includes only those adults who took the problem solving in technology-rich environments assessment, which may differ from the percentage distribution for the literacy and numeracy scales. Approximately 8 percent of the U.S. sample chose not to take the assessment on computer or were unable to do so and therefore did not take the problem solving in technology-rich environments assessment. Detail may not sum to totals because of rounding. Apparent differences between estimates may not be statistically significant. Some population groups did not have enough sample size to meet the minimum reporting standards.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Program for the International Assessment of Adult Competencies (PIAAC), U.S. PIAAC 2012/2014; Organization for Economic Cooperation and Development, PIAAC 2012.

FIGURE C-4-C.

Percentage of U.S. adults age 16 to 34 at each level of proficiency on the PIAAC problem solving in technology-rich environments (PS-TRE) scale, by current student and employment status and highest level of parental education: 2012 and 2014



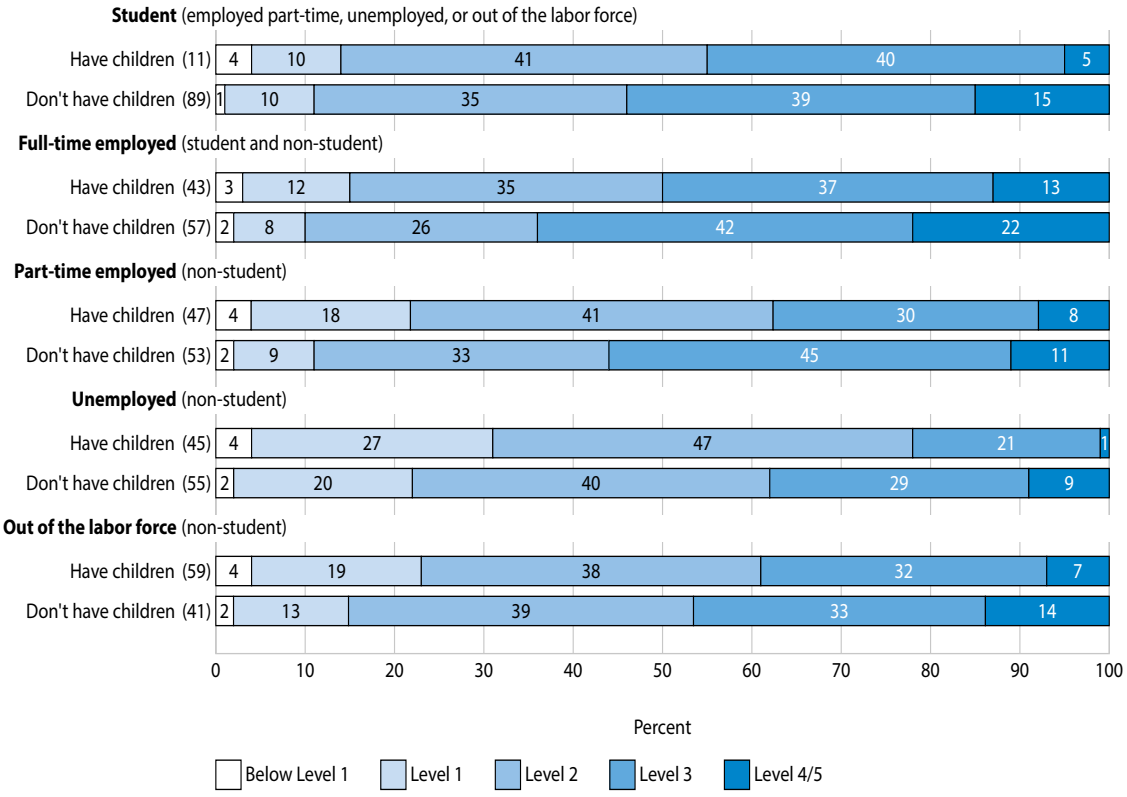
‡ Reporting standards not met.

NOTE: Population percentages of U.S. adults age 16 to 34 by current student and employment status and highest level of parental education appear in parentheses. The population percentage distribution for the problem solving in technology-rich environments scale includes only those adults who took the problem solving in technology-rich environments assessment, which may differ from the percentage distribution for the literacy and numeracy scales. Approximately 8 percent of the U.S. sample chose not to take the assessment on computer or were unable to do so and therefore did not take the problem solving in technology-rich environments assessment. Detail may not sum to totals because of rounding. Apparent differences between estimates may not be statistically significant. Some population groups did not have enough sample size to meet the minimum reporting standards.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Program for the International Assessment of Adult Competencies (PIAAC), U.S. PIAAC 2012/2014; Organization for Economic Cooperation and Development, PIAAC 2012.

FIGURE C-5-A.

Percentage of U.S. adults age 16 to 34 at each level of proficiency on the PIAAC literacy scale, by current student and employment status and whether they have children: 2012 and 2014

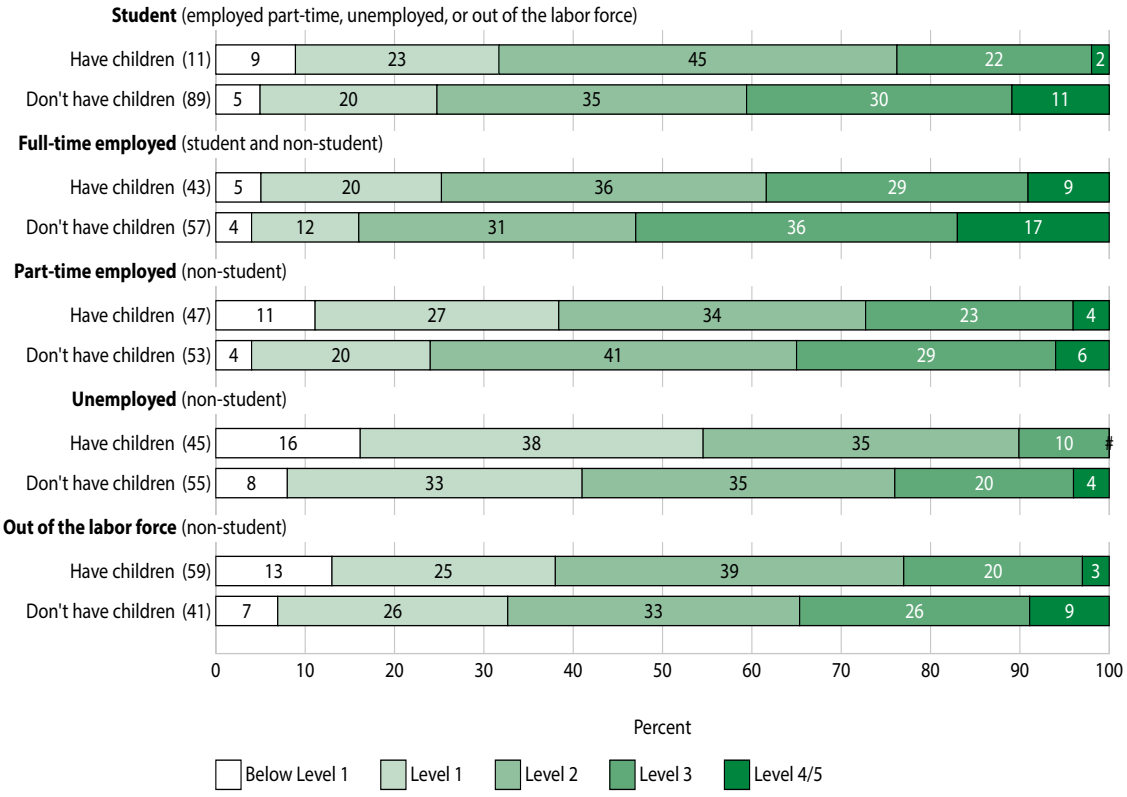


NOTE: Population percentages of U.S. adults age 16 to 34 by current student and employment status and whether they have children appear in parentheses. The population percentage distribution for the problem solving in technology-rich environments scale includes only those adults who took the problem solving in technology-rich environments assessment, which may differ from the percentage distribution for the literacy and numeracy scales. Approximately 8 percent of the U.S. sample chose not to take the assessment on computer or were unable to do so and therefore did not take the problem solving in technology-rich environments assessment. Detail may not sum to totals because of rounding. Apparent differences between estimates may not be statistically significant.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Program for the International Assessment of Adult Competencies (PIAAC), U.S. PIAAC 2012/2014; Organization for Economic Cooperation and Development, PIAAC 2012.

FIGURE C-5-B.

Percentage of U.S. adults age 16 to 34 at each level of proficiency on the PIAAC numeracy scale, by current student and employment status and whether they have children: 2012 and 2014



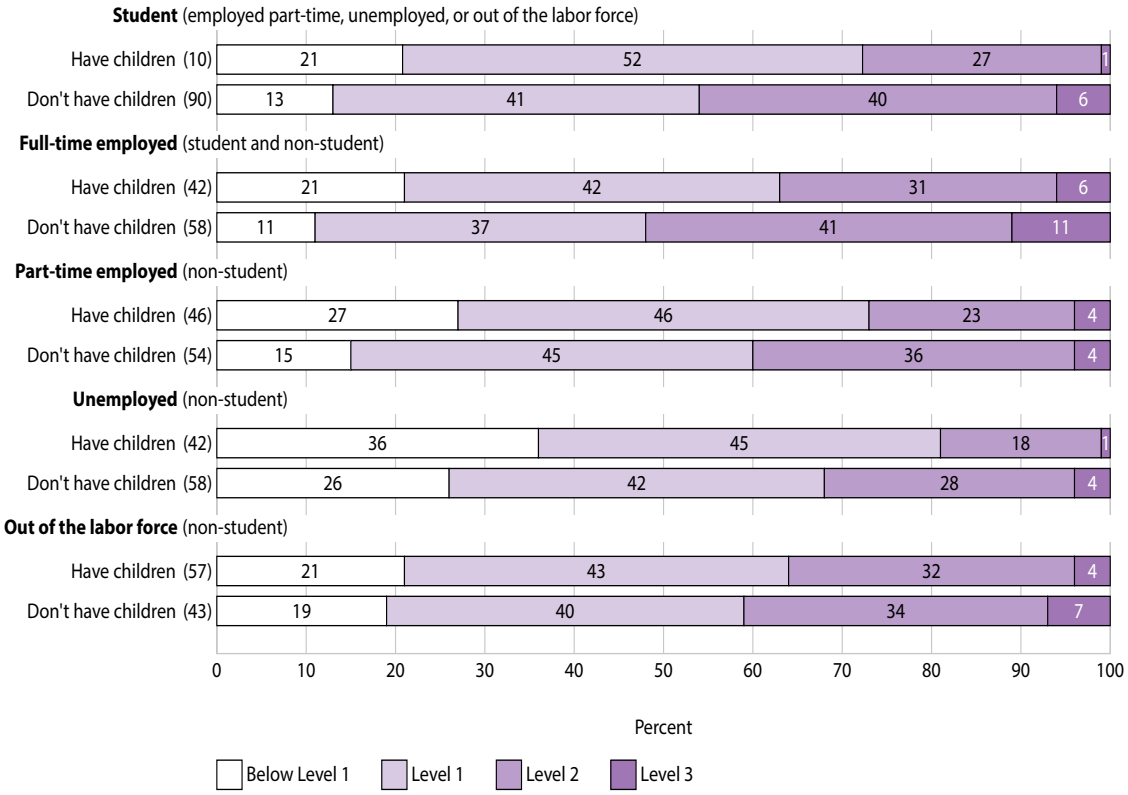
Rounds to zero.

NOTE: Population percentages of U.S. adults age 16 to 34 by current student and employment status and whether they have children appear in parentheses. The population percentage distribution for the problem solving in technology-rich environments scale includes only those adults who took the problem solving in technology-rich environments assessment, which may differ from the percentage distribution for the literacy and numeracy scales. Approximately 8 percent of the U.S. sample chose not to take the assessment on computer or were unable to do so and therefore did not take the problem solving in technology-rich environments assessment. Detail may not sum to totals because of rounding. Apparent differences between estimates may not be statistically significant.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Program for the International Assessment of Adult Competencies (PIAAC), U.S. PIAAC 2012/2014; Organization for Economic Cooperation and Development, PIAAC 2012.

FIGURE C-5-C.

Percentage of U.S. adults age 16 to 34 at each level of proficiency on the PIAAC problem solving in technology-rich environments (PS-TRE) scale, by current student and employment status and whether they have children: 2012 and 2014

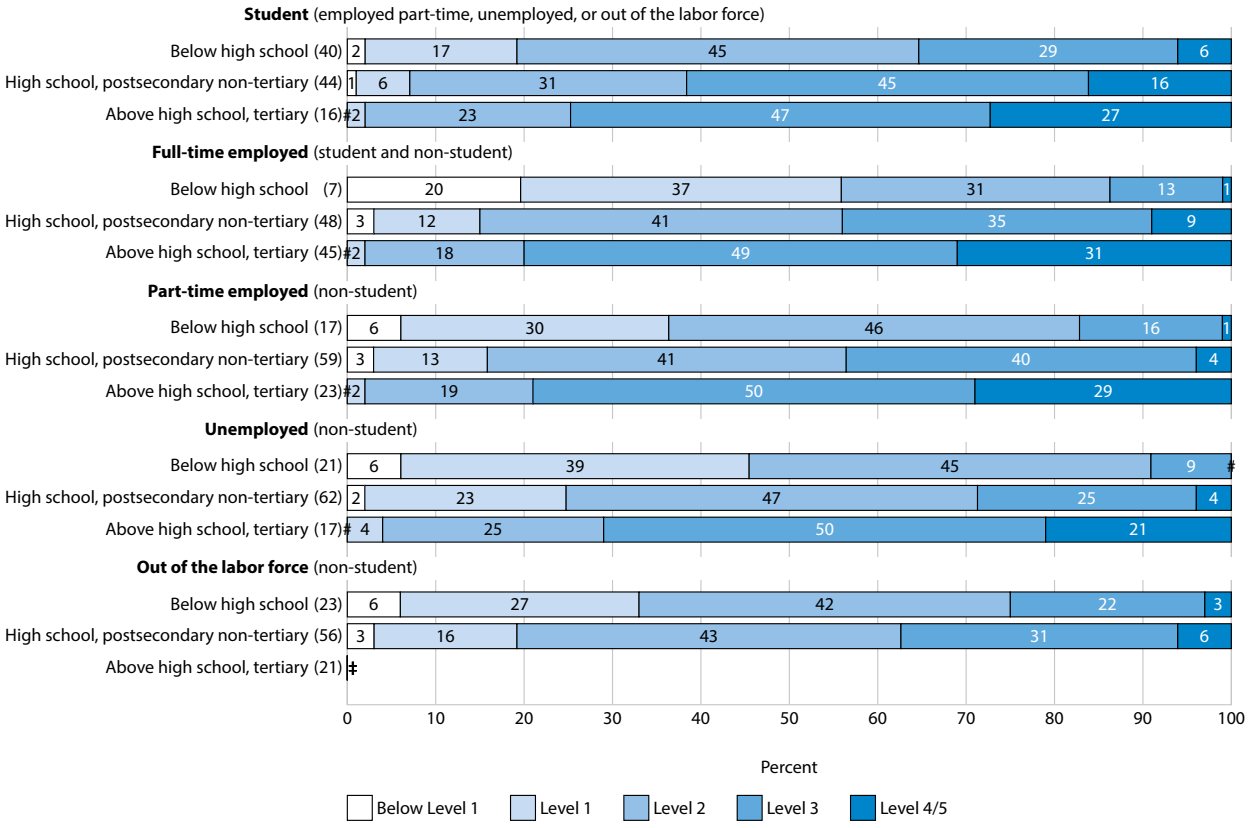


NOTE: Population percentages of U.S. adults age 16 to 34 by current student and employment status and whether they have children appear in parentheses. The population percentage distribution for the problem solving in technology-rich environments scale includes only those adults who took the problem solving in technology-rich environments assessment, which may differ from the percentage distribution for the literacy and numeracy scales. Approximately 8 percent of the U.S. sample chose not to take the assessment on computer or were unable to do so and therefore did not take the problem solving in technology-rich environments assessment. Detail may not sum to totals because of rounding. Apparent differences between estimates may not be statistically significant.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Program for the International Assessment of Adult Competencies (PIAAC), U.S. PIAAC 2012/2014; Organization for Economic Cooperation and Development, PIAAC 2012.

FIGURE C-6-A.

Percentage of U.S. adults age 16 to 34 at each level of proficiency on the PIAAC literacy scale, by current student and employment status and highest level of educational attainment: 2012 and 2014



Rounds to zero.

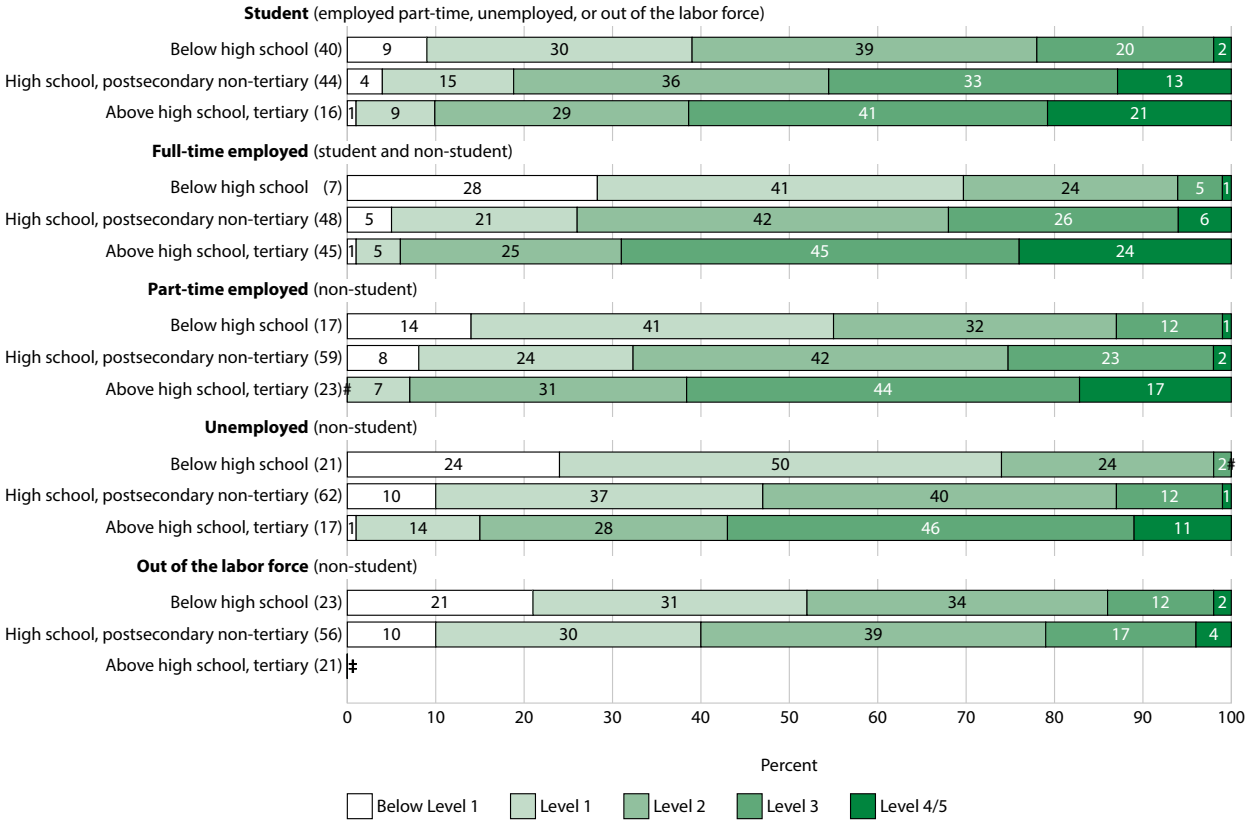
‡ Reporting standards not met.

NOTE: Population percentages of U.S. adults age 16 to 34 by current student and employment status and highest level of educational attainment appear in parentheses. The population percentage distribution for the problem solving in technology-rich environments scale includes only those adults who took the problem solving in technology-rich environments assessment, which may differ from the percentage distribution for the literacy and numeracy scales. Approximately 8 percent of the U.S. sample chose not to take the assessment on computer or were unable to do so and therefore did not take the problem solving in technology-rich environments assessment. Detail may not sum to totals because of rounding. Apparent differences between estimates may not be statistically significant. Some population groups did not have enough sample size to meet the minimum reporting standards.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Program for the International Assessment of Adult Competencies (PIAAC), U.S. PIAAC 2012/2014; Organization for Economic Cooperation and Development, PIAAC 2012.

FIGURE C-6-B.

Percentage of U.S. adults age 16 to 34 at each level of proficiency on the PIAAC numeracy scale, by current student and employment status and highest level of educational attainment: 2012 and 2014



Rounds to zero.

‡ Reporting standards not met.

NOTE: Population percentages of U.S. adults age 16 to 34 by current student and employment status and highest level of educational attainment appear in parentheses. The population percentage distribution for the problem solving in technology-rich environments scale includes only those adults who took the problem solving in technology-rich environments assessment, which may differ from the percentage distribution for the literacy and numeracy scales. Approximately 8 percent of the U.S. sample chose not to take the assessment on computer or were unable to do so and therefore did not take the problem solving in technology-rich environments assessment. Detail may not sum to totals because of rounding. Apparent differences between estimates may not be statistically significant. Some population groups did not have enough sample size to meet the minimum reporting standards.

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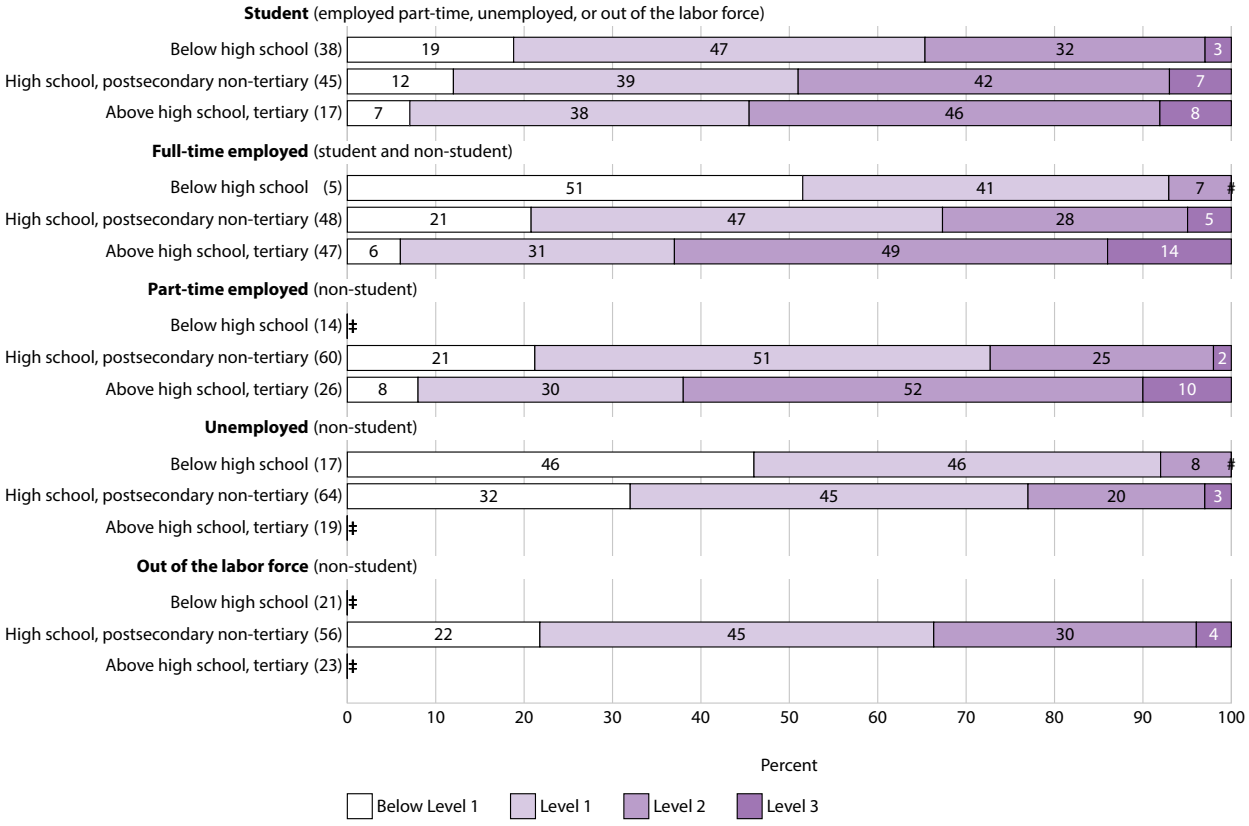
FIGURE C-6-C.

Percentage of U.S. adults age 16 to 34 at each level of proficiency on the PIAAC problem solving in technology-rich environments (PS-TRE) scale, by current student and employment status and highest level of educational attainment: 2012 and 2014



Rounds to zero.

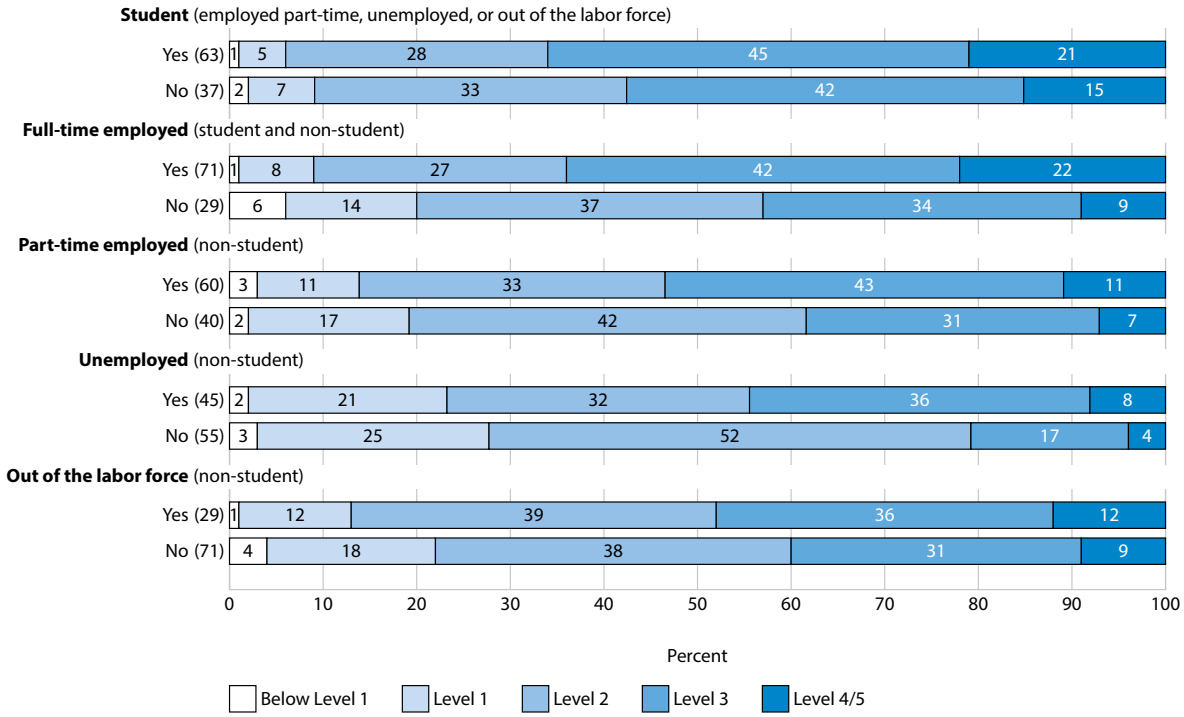
‡ Reporting standards not met.

NOTE: Population percentages of U.S. adults age 16 to 34 by current student and employment status and highest level of educational attainment appear in parentheses. The population percentage distribution for the problem solving in technology-rich environments scale includes only those adults who took the problem solving in technology-rich environments assessment, which may differ from the percentage distribution for the literacy and numeracy scales. Approximately 8 percent of the U.S. sample chose not to take the assessment on computer or were unable to do so and therefore did not take the problem solving in technology-rich environments assessment. Detail may not sum to totals because of rounding. Apparent differences between estimates may not be statistically significant. Some population groups did not have enough sample size to meet the minimum reporting standards.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Program for the International Assessment of Adult Competencies (PIAAC), U.S. PIAAC 2012/2014; Organization for Economic Cooperation and Development, PIAAC 2012.

FIGURE C-7-A.

Percentage of U.S. adults age 16 to 34 at each level of proficiency on the PIAAC literacy scale, by current student and employment status and whether they participated in non-formal education in the last twelve months: 2012 and 2014

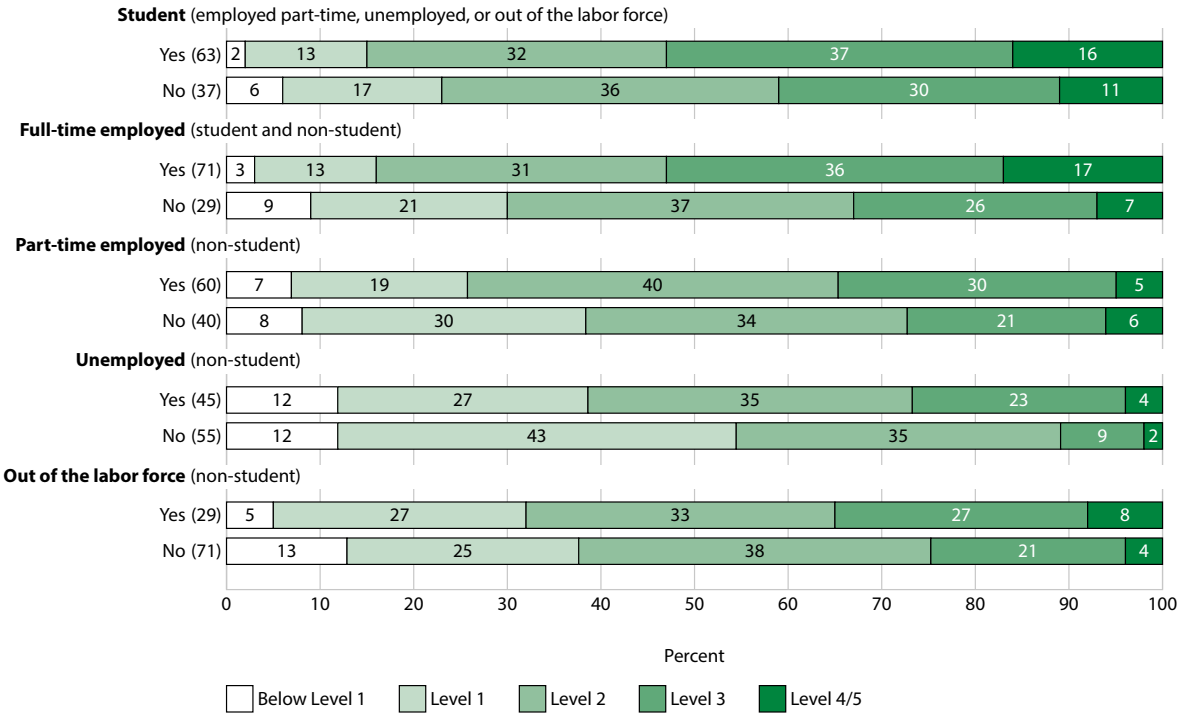


NOTE: Population percentages of U.S. adults age 16 to 34 by current student and employment status and whether they participated in non-formal education in the last twelve months appear in parentheses. The population percentage distribution for the problem solving in technology-rich environments scale includes only those adults who took the problem solving in technology-rich environments assessment, which may differ from the percentage distribution for the literacy and numeracy scales. Approximately 8 percent of the U.S. sample chose not to take the assessment on computer or were unable to do so and therefore did not take the problem solving in technology-rich environments assessment. Detail may not sum to totals because of rounding. Apparent differences between estimates may not be statistically significant.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Program for the International Assessment of Adult Competencies (PIAAC), U.S. PIAAC 2012/2014; Organization for Economic Cooperation and Development, PIAAC 2012.

FIGURE C-7-B.

Percentage of U.S. adults age 16 to 34 at each level of proficiency on the PIAAC numeracy scale, by current student and employment status and whether they participated in non-formal education in the last twelve months: 2012 and 2014



NOTE: Population percentages of U.S. adults age 16 to 34 by current student and employment status and whether they participated in non-formal education in the last twelve months appear in parentheses. The population percentage distribution for the problem solving in technology-rich environments scale includes only those adults who took the problem solving in technology-rich environments assessment, which may differ from the percentage distribution for the literacy and numeracy scales. Approximately 8 percent of the U.S. sample chose not to take the assessment on computer or were unable to do so and therefore did not take the problem solving in technology-rich environments assessment. Detail may not sum to totals because of rounding. Apparent differences between estimates may not be statistically significant.

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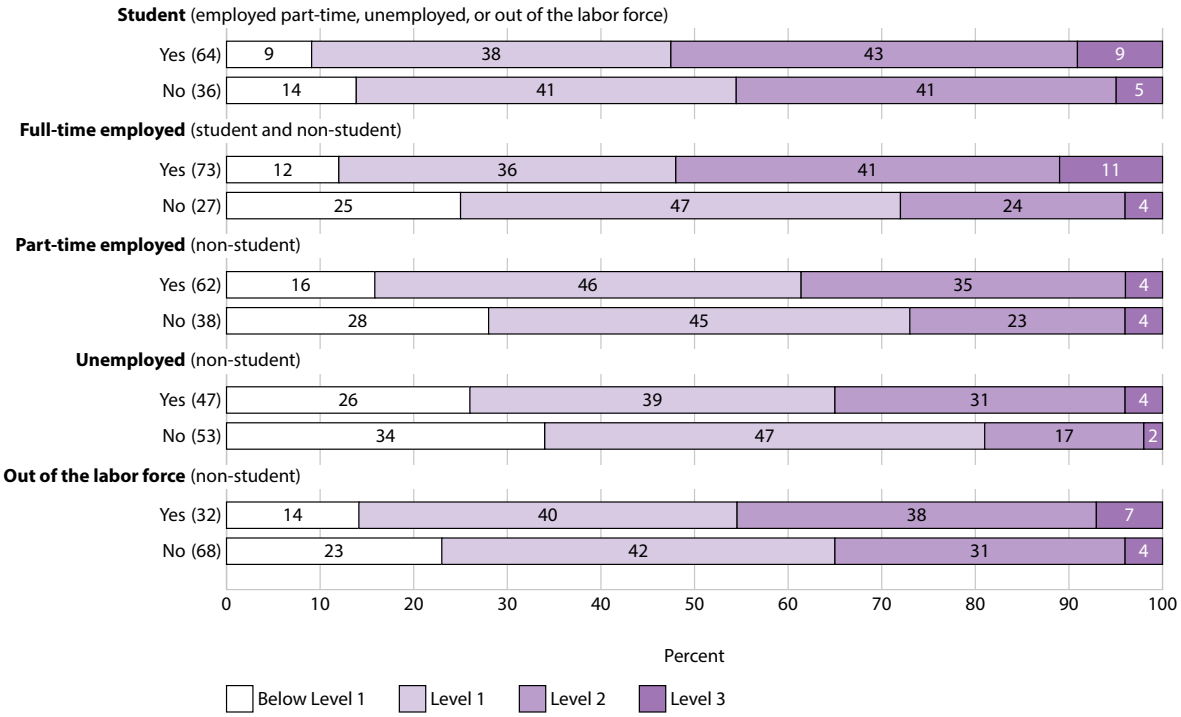
FIGURE C-7-C.

Percentage of U.S. adults age 16 to 34 at each level of proficiency on the PIAAC problem solving in technology-rich environments (PS-TRE) scale, by current student and employment status and whether they participated in non-formal education in the last twelve months: 2012 and 2014

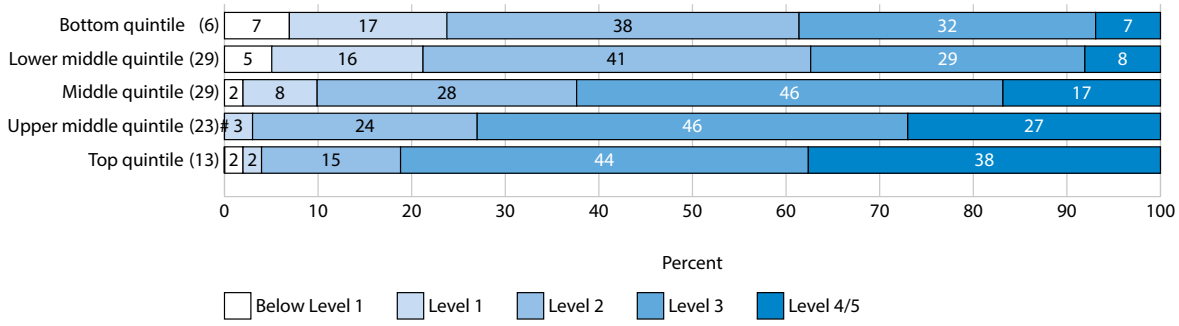


NOTE: Population percentages of U.S. adults age 16 to 34 by current student and employment status and whether they participated in non-formal education in the last twelve months appear in parentheses. The population percentage distribution for the problem solving in technology-rich environments scale includes only those adults who took the problem solving in technology-rich environments assessment, which may differ from the percentage distribution for the literacy and numeracy scales. Approximately 8 percent of the U.S. sample chose not to take the assessment on computer or were unable to do so and therefore did not take the problem solving in technology-rich environments assessment. Detail may not sum to totals because of rounding. Apparent differences between estimates may not be statistically significant.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Program for the International Assessment of Adult Competencies (PIAAC), U.S. PIAAC 2012/2014; Organization for Economic Cooperation and Development, PIAAC 2012.

FIGURE C-8-A.

Percentage of U.S. adults age 16 to 34 who were full-time employed performing at each level of proficiency on the PIAAC literacy scale, by monthly earnings including bonuses for wage and salary earners and self-employed: 2012 and 2014



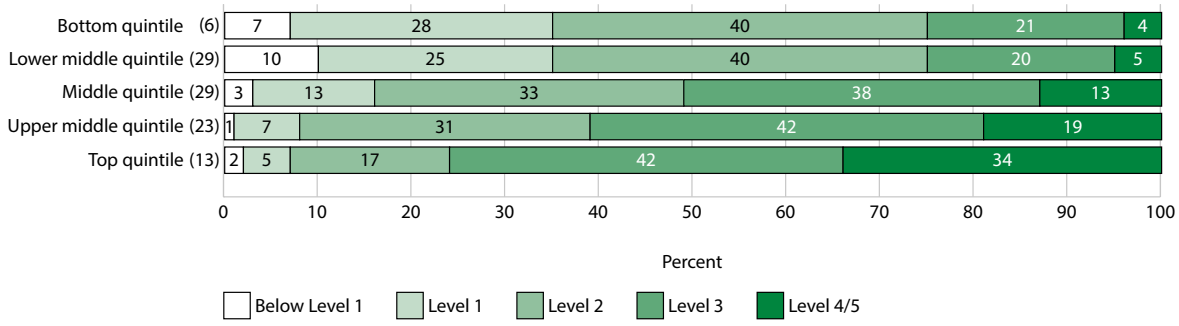
Rounds to zero.

NOTE: Population percentages of U.S. adults age 16 to 34 who were full-time employed, by monthly earnings including bonuses for wage and salary earners and self-employed by quintile appear in parentheses. The population percentage distribution for the problem solving in technology-rich environments scale includes only those adults who took the problem solving in technology-rich environments assessment, which may differ from the percentage distribution for the literacy and numeracy scales. Approximately 8 percent of the U.S. sample chose not to take the assessment on computer or were unable to do so and therefore did not take the problem solving in technology-rich environments assessment. Detail may not sum to totals because of rounding. Apparent differences between estimates may not be statistically significant.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Program for the International Assessment of Adult Competencies (PIAAC), U.S. PIAAC 2012/2014; Organization for Economic Cooperation and Development, PIAAC 2012.

FIGURE C-8-B.

Percentage of U.S. adults age 16 to 34 who were full-time employed performing at each level of proficiency on the PIAAC numeracy scale, by monthly earnings including bonuses for wage and salary earners and self-employed: 2012 and 2014



NOTE: Population percentages of U.S. adults age 16 to 34 who were full-time employed, by monthly earnings including bonuses for wage and salary earners and self-employed by quintile appear in parentheses. The population percentage distribution for the problem solving in technology-rich environments scale includes only those adults who took the problem solving in technology-rich environments assessment, which may differ from the percentage distribution for the literacy and numeracy scales. Approximately 8 percent of the U.S. sample chose not to take the assessment on computer or were unable to do so and therefore did not take the problem solving in technology-rich environments assessment. Detail may not sum to totals because of rounding. Apparent differences between estimates may not be statistically significant.

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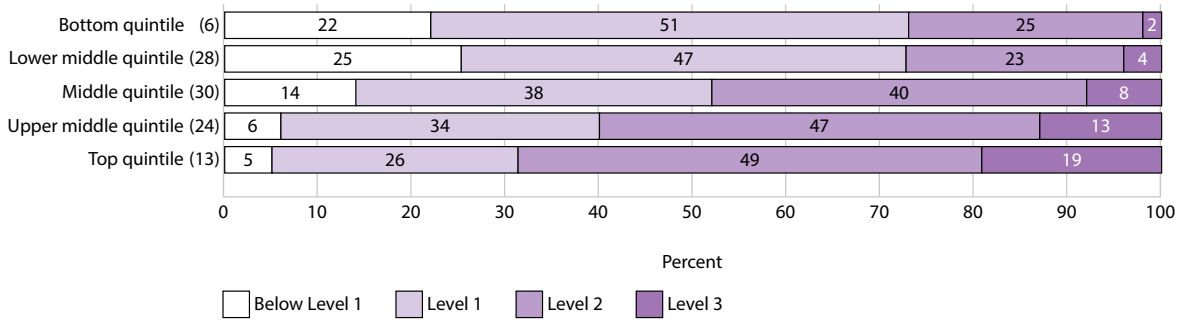
FIGURE C-8-C.

Percentage of U.S. adults age 16 to 34 who were full-time employed performing at each level of proficiency on the PIAAC problem solving in technology-rich environments (PS-TRE) scale, by monthly earnings including bonuses for wage and salary earners and self-employed: 2012 and 2014

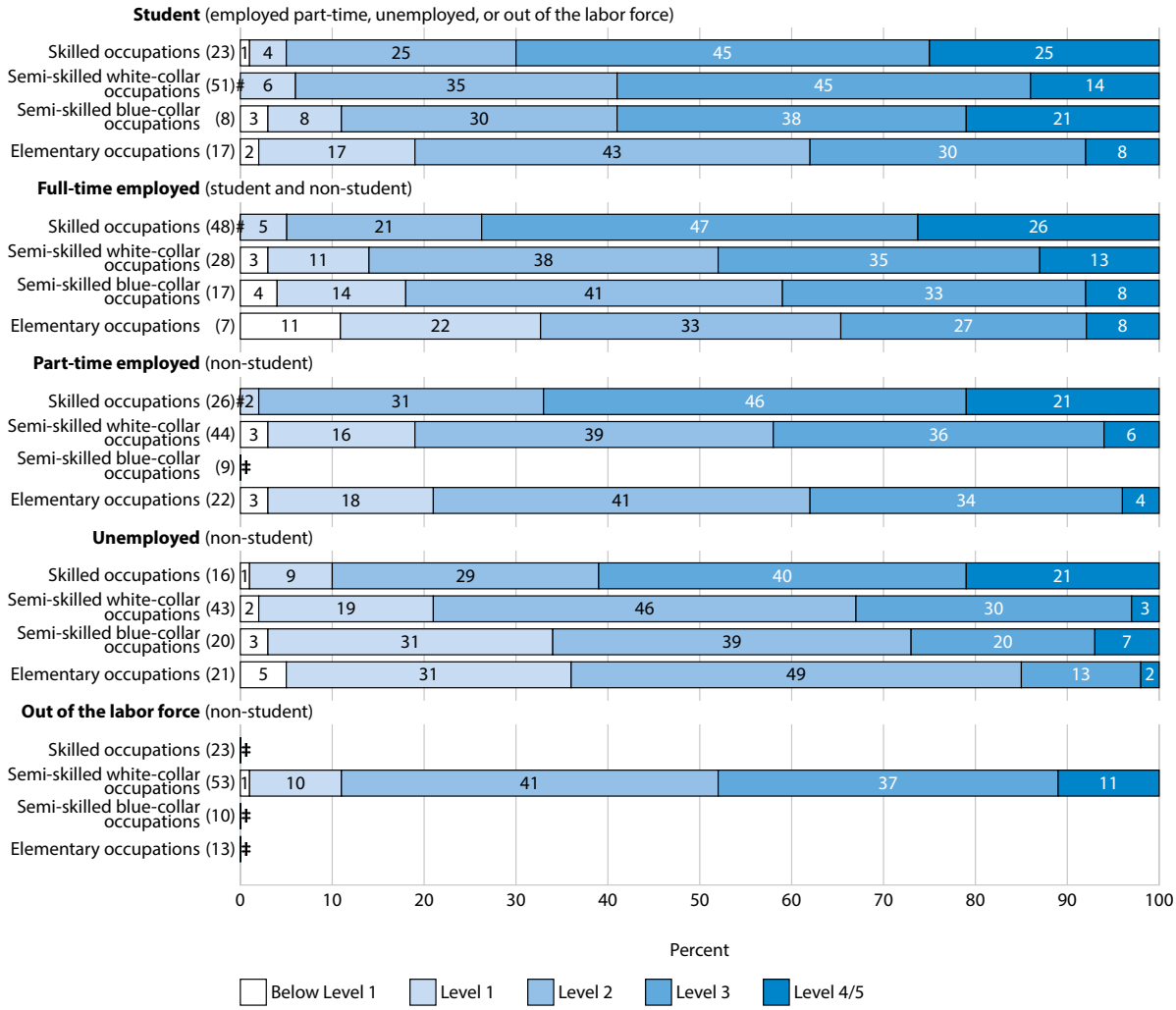


NOTE: Population percentages of U.S. adults age 16 to 34 who were full-time employed, by monthly earnings including bonuses for wage and salary earners and self-employed by quintile appear in parentheses. The population percentage distribution for the problem solving in technology-rich environments scale includes only those adults who took the problem solving in technology-rich environments assessment, which may differ from the percentage distribution for the literacy and numeracy scales. Approximately 8 percent of the U.S. sample chose not to take the assessment on computer or were unable to do so and therefore did not take the problem solving in technology-rich environments assessment. Detail may not sum to totals because of rounding. Apparent differences between estimates may not be statistically significant.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Program for the International Assessment of Adult Competencies (PIAAC), U.S. PIAAC 2012/2014; Organization for Economic Cooperation and Development, PIAAC 2012.

FIGURE C-9-A.

Percentage of U.S. adults age 16 to 34 at each level of proficiency on the PIAAC literacy scale, by current student and employment status and occupational classification: 2012 and 2014



Rounds to zero.

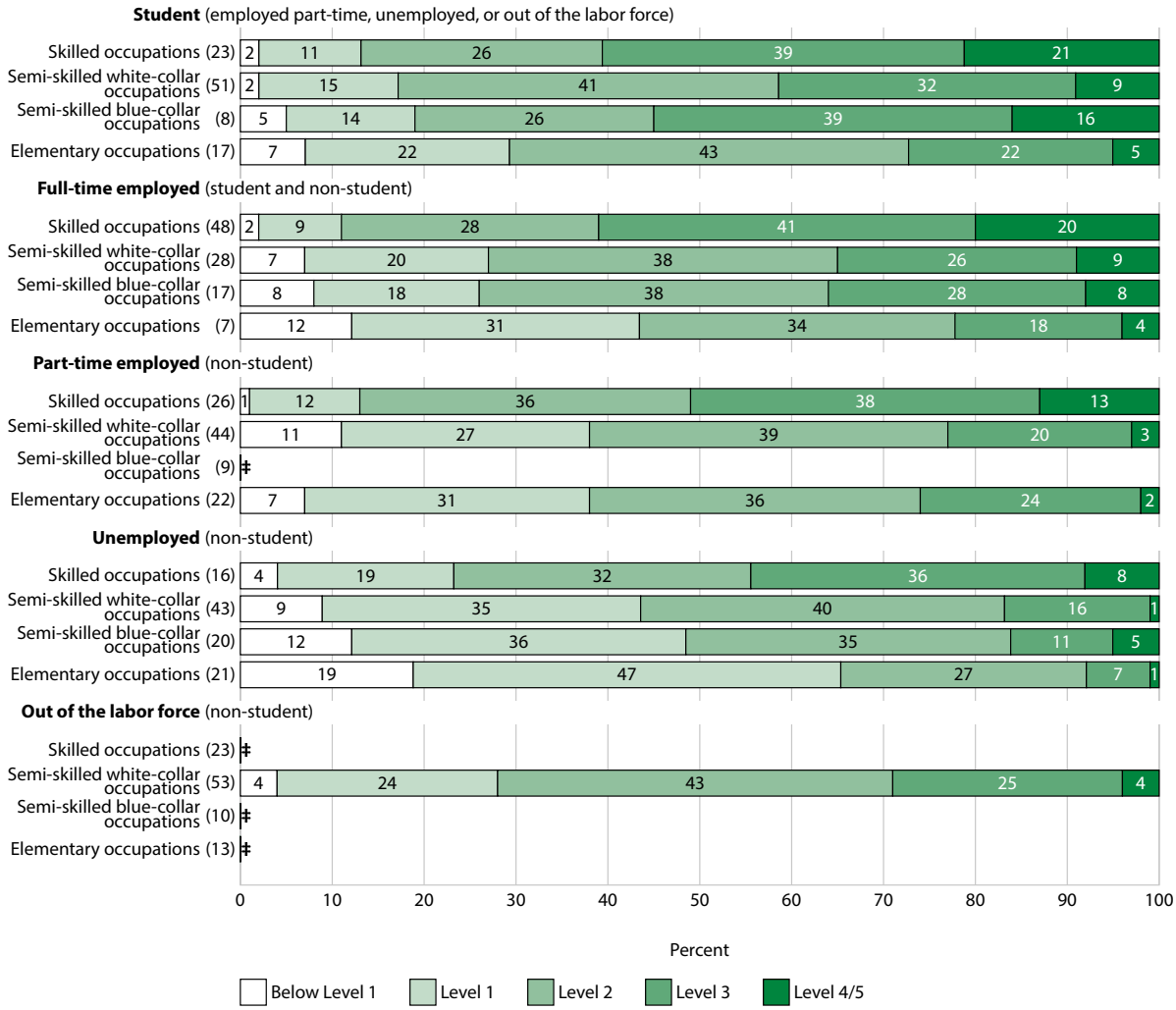
‡ Reporting standards not met.

NOTE: Population percentages of U.S. adults age 16 to 34 by current student and employment status and their occupational classification appear in parentheses. The population percentage distribution for the problem solving in technology-rich environments scale includes only those adults who took the problem solving in technology-rich environments assessment, which may differ from the percentage distribution for the literacy and numeracy scales. Approximately 8 percent of the U.S. sample chose not to take the assessment on computer or were unable to do so and therefore did not take the problem solving in technology-rich environments assessment. Detail may not sum to totals because of rounding. Apparent differences between estimates may not be statistically significant. Some population groups did not have enough sample size to meet the minimum reporting standards. Occupational classification is based on the International Standard Classification of Occupations (ISC0-08). Skilled occupations include legislators, senior officials and managers; professionals; technicians and associate professionals. Semi-skilled white-collar occupations include clerks; service workers and shop and market sales workers. Semi-skilled blue-collar occupations include skilled agricultural and fishery workers; craft and related trades workers; plant and machine operators and assemblers. Elementary occupations include laborers. Additional details on the derivation of the occupational variable, ISCOSKIL4, can be found in the OECD's PIAAC Derived variables codebook accessed at http://www.oecd.org/skills/piaac/codebook%20for%20DVs%203_16%20March%202015.docx.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Program for the International Assessment of Adult Competencies (PIAAC), U.S. PIAAC 2012/2014; Organization for Economic Cooperation and Development, PIAAC 2012.

FIGURE C-9-B.

Percentage of U.S. adults age 16 to 34 at each level of proficiency on the PIAAC numeracy scale, by current student and employment status and occupational classification: 2012 and 2014



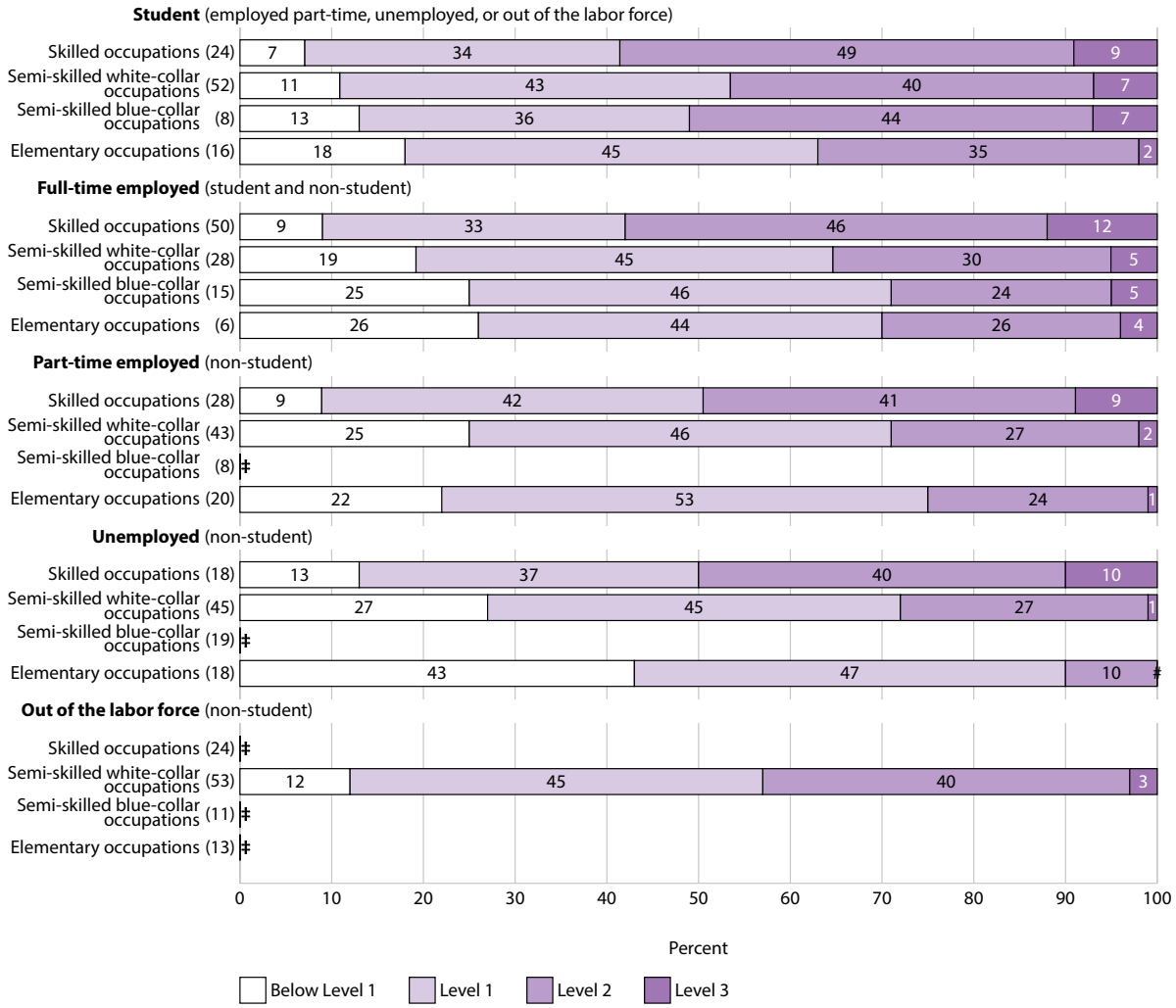
‡ Reporting standards not met.

NOTE: Population percentages of U.S. adults age 16 to 34 by current student and employment status and their occupational classification appear in parentheses. The population percentage distribution for the problem solving in technology-rich environments scale includes only those adults who took the problem solving in technology-rich environments assessment, which may differ from the percentage distribution for the literacy and numeracy scales. Approximately 8 percent of the U.S. sample chose not to take the assessment on computer or were unable to do so and therefore did not take the problem solving in technology-rich environments assessment. Detail may not sum to totals because of rounding. Apparent differences between estimates may not be statistically significant. Some population groups did not have enough sample size to meet the minimum reporting standards. Occupational classification is based on the International Standard Classification of Occupations (ISC0-08). Skilled occupations include legislators, senior officials and managers; professionals; technicians and associate professionals. Semi-skilled white-collar occupations include clerks; service workers and shop and market sales workers. Semi-skilled blue-collar occupations include skilled agricultural and fishery workers; craft and related trades workers; plant and machine operators and assemblers. Elementary occupations include laborers. Additional details on the derivation of the occupational variable, ISCOSKIL4, can be found in the OECD's PIAAC Derived variables codebook accessed at http://www.oecd.org/skills/piaac/codebook%20for%20DVs%203_16%20March%202015.docx.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Program for the International Assessment of Adult Competencies (PIAAC), U.S. PIAAC 2012/2014; Organization for Economic Cooperation and Development, PIAAC 2012.

FIGURE C-9-C.

Percentage of U.S. adults age 16 to 34 at each level of proficiency on the PIAAC problem solving in technology-rich environments (PS-TRE) scale, by current student and employment status and occupational classification: 2012 and 2014



Rounds to zero.

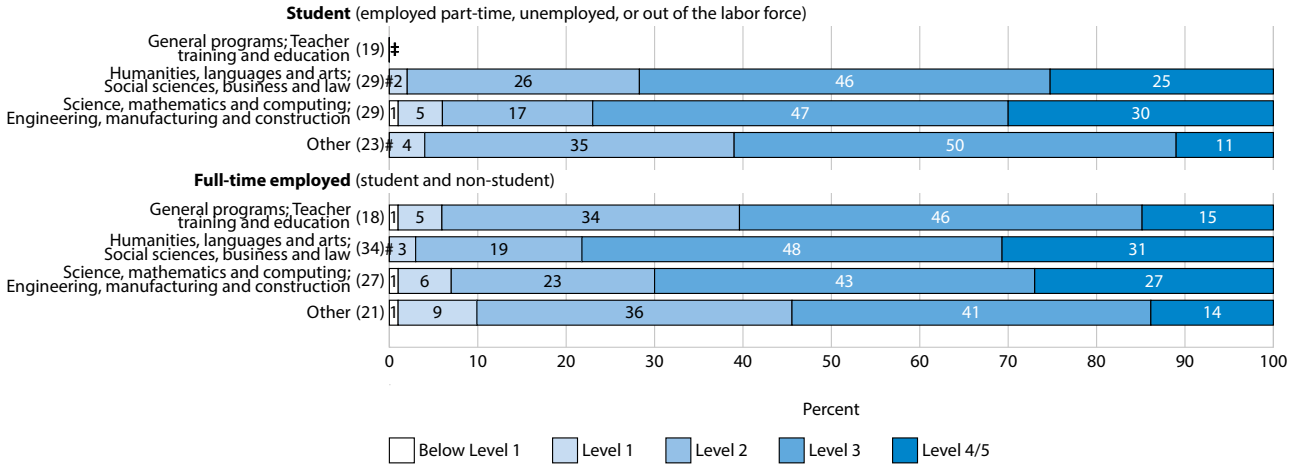
‡ Reporting standards not met.

NOTE: Population percentages of U.S. adults age 16 to 34 by current student and employment status and their occupational classification appear in parentheses. The population percentage distribution for the problem solving in technology-rich environments scale includes only those adults who took the problem solving in technology-rich environments assessment, which may differ from the percentage distribution for the literacy and numeracy scales. Approximately 8 percent of the U.S. sample chose not to take the assessment on computer or were unable to do so and therefore did not take the problem solving in technology-rich environments assessment. Detail may not sum to totals because of rounding. Apparent differences between estimates may not be statistically significant. Some population groups did not have enough sample size to meet the minimum reporting standards. Occupational classification is based on the International Standard Classification of Occupations (ISC0-08). Skilled occupations include legislators, senior officials and managers; professionals; technicians and associate professionals. Semi-skilled white-collar occupations include clerks; service workers and shop and market sales workers. Semi-skilled blue-collar occupations include skilled agricultural and fishery workers; craft and related trades workers; plant and machine operators and assemblers. Elementary occupations include laborers. Additional details on the derivation of the occupational variable, ISCOSKIL4, can be found in the OECD's PIAAC Derived variables codebook accessed at http://www.oecd.org/skills/piaac/codebook%20for%20DVs%203_16%20March%202015.docx.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Program for the International Assessment of Adult Competencies (PIAAC), U.S. PIAAC 2012/2014; Organization for Economic Cooperation and Development, PIAAC 2012.

FIGURE C-10-A.

Percentage of U.S. adults age 16 to 34 at each level of proficiency on the PIAAC literacy scale, by current student and employment status and area of study for their highest level of educational attainment: 2012 and 2014



Rounds to zero.

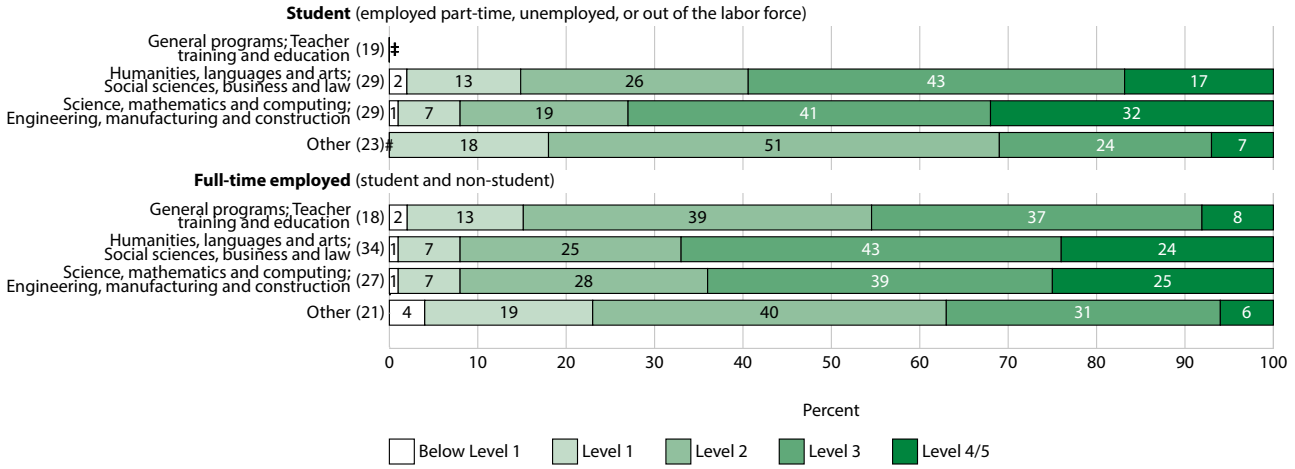
‡ Reporting standards not met.

NOTE: Population percentages of U.S. adults age 16 to 34 by current student and employment status and area of study for their highest level of educational attainment appear in parentheses. The population percentage distribution for the problem solving in technology-rich environments scale includes only those adults who took the problem solving in technology-rich environments assessment, which may differ from the percentage distribution for the literacy and numeracy scales. Approximately 8 percent of the U.S. sample chose not to take the assessment on computer or were unable to do so and therefore did not take the problem solving in technology-rich environments assessment. Detail may not sum to totals because of rounding. Apparent differences between estimates may not be statistically significant. Some population groups did not have enough sample size to meet the minimum reporting standards.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Program for the International Assessment of Adult Competencies (PIAAC), U.S. PIAAC 2012/2014; Organization for Economic Cooperation and Development, PIAAC 2012.

FIGURE C-10-B.

Percentage of U.S. adults age 16 to 34 at each level of proficiency on the PIAAC numeracy scale, by current student and employment status and area of study for their highest level of educational attainment: 2012 and 2014



Rounds to zero.

‡ Reporting standards not met.

NOTE: Population percentages of U.S. adults age 16 to 34 by current student and employment status and area of study for their highest level of educational attainment appear in parentheses. The population percentage distribution for the problem solving in technology-rich environments scale includes only those adults who took the problem solving in technology-rich environments assessment, which may differ from the percentage distribution for the literacy and numeracy scales. Approximately 8 percent of the U.S. sample chose not to take the assessment on computer or were unable to do so and therefore did not take the problem solving in technology-rich environments assessment. Detail may not sum to totals because of rounding. Apparent differences between estimates may not be statistically significant. Some population groups did not have enough sample size to meet the minimum reporting standards.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Program for the International Assessment of Adult Competencies (PIAAC), U.S. PIAAC 2012/2014; Organization for Economic Cooperation and Development, PIAAC 2012.

FIGURE C-10-C.

Percentage of U.S. adults age 16 to 34 at each level of proficiency on the PIAAC problem solving in technology-rich environments (PS-TRE) scale, by current student and employment status and area of study for their highest level of educational attainment: 2012 and 2014

‡ Reporting standards not met.

NOTE: Population percentages of U.S. adults age 16 to 34 by current student and employment status and area of study for their highest level of educational attainment appear in parentheses. The population percentage distribution for the problem solving in technology-rich environments scale includes only those adults who took the problem solving in technology-rich environments assessment, which may differ from the percentage distribution for the literacy and numeracy scales. Approximately 8 percent of the U.S. sample chose not to take the assessment on computer or were unable to do so and therefore did not take the problem solving in technology-rich environments assessment. Detail may not sum to totals because of rounding. Apparent differences between estimates may not be statistically significant. Some population groups did not have enough sample size to meet the minimum reporting standards.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Program for the International Assessment of Adult Competencies (PIAAC), U.S. PIAAC 2012/2014; Organization for Economic Cooperation and Development, PIAAC 2012.

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