PIAAC: The International Adult Skills Survey
What States can Soon Learn about the Skills of their Working-Age Adult Population

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What is PIAAC?

The Program for the International Assessment of Adult Competencies (PIAAC) is an international large-scale survey with

A direct assessment of
Literacy, Numeracy, and Digital Problem Solving

A background questionnaire on
Education, work experience and training, skill-use at work and at home, demographics, income, health, and civic participation
What is PIAAC?

The Program for the International Assessment of Adult Competencies (PIAAC) is an international large-scale survey

Organized by the Organization for Economic Cooperation and Development (OECD)

Conducted in sampled households with adults (ages 16 to 65)

Administered in 38 countries or regions, including the United States, between 2011 and 2017
## What is PIAAC?

The Program for the International Assessment of Adult Competencies (PIAAC) is an international large-scale survey administered in multiple countries. Here is a list of the countries that participated:

<table>
<thead>
<tr>
<th>Australia</th>
<th>England and Northern Ireland-United Kingdom</th>
<th>Indonesia</th>
<th>Mexico</th>
<th>Slovak Republic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>Ecuador</td>
<td>Ireland</td>
<td>Netherlands</td>
<td>Slovenia</td>
</tr>
<tr>
<td>Belgium (Flemish)</td>
<td>Estonia</td>
<td>Israel</td>
<td>New Zealand</td>
<td>Spain</td>
</tr>
<tr>
<td>Canada</td>
<td>Finland</td>
<td>Italy</td>
<td>Norway</td>
<td>Sweden</td>
</tr>
<tr>
<td>Chile</td>
<td>France</td>
<td>Japan</td>
<td>Peru</td>
<td>Turkey</td>
</tr>
<tr>
<td>Cyprus</td>
<td>Germany</td>
<td>Kazakhstan</td>
<td>Poland</td>
<td>United States</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>Greece</td>
<td>Korea, Republic of</td>
<td>Russian Federation</td>
<td></td>
</tr>
<tr>
<td>Denmark</td>
<td>Hungary</td>
<td>Lithuania</td>
<td>Singapore</td>
<td></td>
</tr>
</tbody>
</table>

This program aims to assess adult competencies in reading, mathematics, and problem solving, providing insights into the skills and abilities of adults in various countries around the world.
What is PIAAC?

The Program for the International Assessment of Adult Competencies (PIAAC) is an international large–scale survey.

Provides internationally comparable and nationally representative estimates of adult skills in literacy, numeracy, and digital problem solving.
What is PIAAC?

The Program for the International Assessment of Adult Competencies (PIAAC) is an international large-scale survey that provides internationally comparable and nationally representative estimates of adult skills in literacy, numeracy, and digital problem solving. It replaces NALS and NAAL.
Previous U.S. Adult Literacy Surveys

**1992 National Adult Literacy Survey (NALS)**

- Total Sample Size: Over 26,000
  1. National: 13, 600
  2. States sample size: each 1,000-1,500
  3. Twelve states participated:

**2003 National Assessment of Adult Literacy (NAAL)**

- Total Sample Size: Over 19,000
  1. National: 12,700
  2. States sample size: each 1,000-1,500
  3. Six states participated:
     - Kentucky, Maryland, Massachusetts, Missouri, New York, and Oklahoma
What is PIAAC?

The Program for the International Assessment of Adult Competencies (PIAAC) is an international large-scale survey.

Provides internationally comparable and nationally representative estimates of adult skills in literacy, numeracy, and digital problem solving.

Replaces NALS and NAAL.

But unlike NALS and NAAL:
- not a single national data collection.
U.S. Cycle 1 Data Collections

PIAAC International Cycle 1: 2011-2017 (38 countries or regions, including the US)

- Round 1 – Household sample of adults (5,010) Ages 16-65
- Round 2 – Household sample of adults (3,660) Ages 16-65, and 66-74
- Round 3 – Household sample of adults (3,659) Ages 16-65, and 66-74
What is PIAAC?

The Program for the International Assessment of Adult Competencies (PIAAC) is an international large-scale survey

Provides internationally comparable and nationally representative estimates of adult skills in literacy, numeracy, and digital problem solving.

Replaces NALS and NAAL

But unlike NALS and NAAL
- not a single national data collection
- no states participated in U.S. cycle 1 data collections
What about state results?

Small Area Estimation (SAE) with 2011-2017 data

Provides only indirect or modeled estimates of state and county-level results of

- Average scale scores in literacy and numeracy
- Percentage at Level 1 or below (“very low skilled adults”)

Used with NAAL data for county-level result

Does not permit secondary analyses of state’s subpopulations
U.S. Cycle 2 Data Collection

PIAAC International Cycle 1: 2011-2017  (38 countries or regions, including the US)
- Round 1 – Household sample of adults (5,010)  Ages 16-65
- Round 2 – Household sample of adults (3,660)  Ages 16-65, and 66-74
- Round 3 – Household sample of adults (3,659)  Ages 16-65, and 66-74

PIAAC International Cycle 2: 2021-2022  (35+ countries or regions, including the US and ? states)
Benefits of State Samples

1. Provides policymakers data on the education, work experience, and skills of subpopulations
   - Low skilled
   - English Language Learners (ELL)
   - Unemployed

2. Helps with priority-setting, decision-making, and allocation of state, county, and city resources for
   - upskilling the adult population
   - making short- and long-term plans for adults education
Benefits of State Samples

3. States will be able to benchmark or directly compare their results with other countries, the OECD international average, the United States as a whole, and other states.

4. Provides trend data for states that participated in either the 1992 NALS or 2003 NAAL.

5. Leverages national resources to reduce cost.
   
   *States don’t have to pay for*
   
   - Sampling or assessment design
   - Assessment instruments (questionnaires and direct assessment modules)
Plans for 2021

1. **U.S. National Sample** (minimum of 5,000 completed cases, ages of 16-74)

2. **State Sample** - Option for direct state estimates
   - Required minimum sample size of 1,000 (ages of 16-74) completed cases for each state
   - Cost by state (est. in $2.7 -$3.0 million range)
   - Sign contract with the national contractor, and follow OECD/U.S. procedures and options
   - Include State results in OECD international report, the U.S. national report and website (mapping system)
   - Own state-level data and report (available after release of the national report)
Timeline for State Participation

- Inform NCES of interest by January 2020
- Sign Contract with the national contractor by September 2020
What did PIAAC find?
Average scores on the PIAAC literacy scale for adults age 16 to 65, by participating country and region: 2012 and 2014.

Average scores on the PIAAC numeracy scale for adults age 16 to 65, by participating country and region: 2012 and 2014.

- **Japan**: 288
- **Finland**: 282
- **Netherlands**: 280
- **Sweden**: 279
- **Norway**: 278
- **Slovak Republic**: 278
- **Slovenia**: 276
- **Czech Republic**: 276
- **Austria**: 275
- **Estonia**: 273
- **Germany**: 272
- **New Zealand**: 271
- **Lithuania**: 269
- **Canada**: 267
- **Cyprus**: 265
- **Korea**: 263
- **Poland**: 262
- **Slovenia**: 260
- **Singapore**: 258
- **United States**: 257
- **Ireland**: 256
- **France**: 254
- **Greece**: 252
- **Israel**: 251
- **Italy**: 247
- **Spain**: 246
- **Turkey**: 219
- **Chile**: 206

- **Significantly higher than the United States**
- **Not significantly different than the United States**
- **Significantly lower than the United States**

Average scores on the PIAAC problem solving in technology-rich environments scale for adults age 16 to 65, by participating country and region: 2012 and 2014.

How were the adult skills measured?
What do these results mean?

What do we make of 272 in literacy and 257 in numeracy?

- We can say that “these are average scores on a 0-500 scale set with a standard deviation of 50”
- But a more helpful way to describe the results is relative to Proficiency levels defined by a specific set of concrete skills
- There are 6 levels for literacy and numeracy
Descriptions of the PIAAC proficiency levels for literacy defining what adults can do at each level

- Below Level 1 (0-175)
  - Locate single piece of information in familiar texts.

- Level 1 (176-225)
  - Read relatively short digital, print or mixed texts to locate single text.

- Level 2 (226-275)
  - Make matches between text and information that may require low level paraphrasing and drawing low-level inferences.

- Level 3 (276-325)
  - Identify, interpret, or evaluate one or more pieces of information and often require varying levels of inference.

- Level 4 (326-375)
  - Perform multiple-step operations to integrate, interpret or synthesize information from complex texts, and may require complex inferences.

- Level 5 (376-500)
  - Integrate information across multiple, dense texts; construct syntheses, ideas or points of view; or evaluate evidence based arguments.
The test-taker is asked to identify a job that meets specific criteria.

Which company is looking for an employee to work at night?

95% of U.S. adults can perform at level 1 or better

Note: Not an actual replica of test item
The test-taker is asked to identify two reasons for the limited use of generic medicines.

82% of U.S. adults can perform at level 2 or better.

The test-taker must not be distracted by statements that are reasons that generic medicines are cheaper.

The test-taker needs to identify the two explicit reasons that generic medicines are not commonly used.

Note: Not an actual replica of test item
The test-taker is asked to identify a book that meets specific criteria.

Which book suggests that the claims made both for and against genetically modified foods are unreliable?

13% of U.S. adults can perform at level 4 or 5

The answer must be inferred from the search result that says book D “describes how both sides in this hotly contested debate have manufactured propaganda...”

Note: Not an actual replica of test item
Percentage of adults age 16 to 65 at each level of proficiency on the PIAAC literacy scale: 2012 and 2014

Siri and Alexa today can perform literacy tasks at level 2.
Half of U.S. working-age adults (16-65) have literacy skills at or below level 2.

THAT’S NEARLY 100 MILLION ADULTS IN THE US
Descriptions of the PIAAC proficiency levels for numeracy defining what adults can do at each level

Below Level 1 (0-175)
- Perform basic tasks: counting, arithmetic operations with whole numbers.

Level 1 (176-225)
- Perform one-step tasks: count; sort; arithmetic operations; understanding simple percent (ex. 50%).

Level 2 (226-275)
- Perform 2 or more calculations, simple measurement; spatial representation; estimation; and interpret simple tables, graphs.

Level 3 (276-325)
- Understand & work with mathematical patterns, proportions, basic statistics expressed in verbal or numerical form.

Level 4 (326-375)
- Perform analysis, complex reasoning, statistics and chance; spatial relationships; and communicating well-reasoned explanations for answers.

Level 5 (376-500)
- Understand complex abstract mathematical and statistical ideas, embedded in complex texts, draw inferences; arguments or models; justify, reflect on solutions or choices.
The test-taker is told the car holds 24 gallons of gas and is asked to calculate a fraction of that amount.

About how many gallons remain in the gas tank?

18

The test-taker needs to estimate that ¾ of 24 gallons means 18 gallons remain in the tank.

61% of U.S. adults can perform at level 2 or better
The test-taker is asked to calculate the total amount one would need to pay for both shoes during the sale.

Running Shoes
SALE! Buy one pair – get the second (of equal or lesser value) for half price!

The test-taker needs to calculate and enter the correct dollar amount for the two pairs of shoes on sale.

How much would you pay if you bought both pairs on sale?

$ 48.95

39% of U.S. adults can perform at level 3 or better
The test-taker is asked to calculate the mean for the total expenditures over three months.

What is the mean for the total expenditures over the three months?

84 Euros

The test-taker needs to divide the total 252 by 3 and enter the correct answer.

10% of U.S. adults can perform at level 4 or 5

The test-taker is presented with information about a restaurant’s income and expenditures.

Note: Not an actual replica of test item
A&W’s “1/3-pounder” priced the same as McDonald’s “1/4 pounder” flopped in the early 1980s because customers thought they were being ripped off. Today 27% are unlikely to know any better.

Alexa and Siri can perform numeracy tasks at level 4. But most U.S. adults cannot understand the answers...like how a test for cancer can be 98% accurate and yet only 20% or 30% of those who have a “positive” result would be expected to actually have cancer.
Over 60% of the U.S. working-age adults (16-65) have numeracy skills at or below level 2.

THAT’S OVER 121 MILLION ADULTS IN THE US
How do U.S. adults compare internationally?
The U.S. has a slightly larger percentage of the population at level 4/5 than the International Average and a larger percentage in the bottom two levels.

Percentage of adults age 16 to 65 at each level of proficiency on the PIAAC literacy scale: 2012 and 2014

United States

- Level 1: 13%
- Level 2: 33%
- Level 3: 36%
- Level 4/5: 13%

PIAAC international average

- Level 1: 12%
- Level 2: 34%
- Level 3: 39%
- Level 4/5: 12%
The U.S. has smaller percentage of the population in the top three levels than the International Average and a larger percentage in the bottom two levels.

Percentage of adults age 16 to 65 at each level of proficiency on the PIAAC numeracy scale: 2012 and 2014

United States: 8, 19, 34, 29, 10

PIAAC international average: 5, 14, 34, 35, 12

The U.S. has smaller percentage of the population in the top three levels than the International Average and a larger percentage in the bottom two levels.
Countries typically perform slightly lower in numeracy than literacy, and U.S. is not an exception to this pattern; however, U.S. numeracy is the lowest among PIAAC countries given its level of literacy.
Countries typically perform slightly lower in numeracy than literacy, and U.S. is not an exception to this pattern; however, U.S. numeracy is the lowest among PIAAC countries given its level of literacy.

Mean literacy proficiency and numeracy proficiency of age 16 to 65: 2012 and 2014
What are the skills of U.S. high school and college graduates compared to other participating countries?
In literacy, U.S. adults with a Bachelor’s degree score above the international average, while U.S. adults with high school education or below score below the international average.

Average scores on the PIAAC literacy scale for adults age 16 to 65, by highest level of educational attainment: 2012 and 2014

- Graduate or professional degree, 311
- Bachelor's degree, 301
- Associate's degree, 285
- High school credential, 263
- Below high school, 229

United States

- Graduate or professional degree, 307
- Bachelor's degree, 297
- Associate's degree, 285
- High school credential, 271
- Below high school, 246

PIAAC international average

In numeracy, U.S. adults at every education level are below the international average.

<table>
<thead>
<tr>
<th>Educational Attainment</th>
<th>Score</th>
<th>United States</th>
<th>PIAAC International Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graduate or professional degree</td>
<td>303</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bachelor's degree</td>
<td>290</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Associate's degree</td>
<td>269</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High school credential</td>
<td>247</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Below high school</td>
<td>211</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

United States PIAAC international average

Average scores on the PIAAC numeracy scale for adults age 16 to 65, by highest level of educational attainment: 2012 and 2014.
U.S. adults with high school education do not outperform their international peers in literacy while those with a Bachelor’s degree do outperform some of their international peers.

Average scores on the PIAAC literacy scale for adults age 16 to 65, by highest level of educational attainment: 2012 and 2014

- Japan: 318
- Finland: 314
- United States: 301
- Canada: 298
- PIAAC international average: 297
- Republic of Korea: 295
- France: 294
- Germany: 290

- Japan: 289
- Finland: 282
- Republic of Korea: 272
- PIAAC international average: 271
- Canada: 269
- Germany: 265
- United States: 263
- France: 262
U.S. adults with high school education perform below their international peers in numeracy while those with a Bachelor’s degree do perform similarly to some of their peers.

Average scores on the PIAAC numeracy scale for adults age 16 to 65, by highest level of educational attainment: 2012 and 2014

- Japan: 317
- Finland: 307
- PIAAC international average: 296
- Germany: 295
- Canada: 294
- France: 293
- Republic of Korea: 291
- United States: 290

- Japan: 282
- Finland: 276
- PIAAC international average: 268
- Germany: 267
- Republic of Korea: 262
- Canada: 259
- France: 253
- United States: 247
U.S. adults with high school education score below a high school dropout in Japan in literacy.
U.S. adults with an Associate’s degree score well below a high school graduate in Japan in numeracy.
Is innumeracy a predictor of unemployment and incarceration?

FOCUS ON NUMERACY
What PIAAC tells us about numeracy

There is a positive correlation between proficiency and income, but numeracy is more strongly correlated than literacy.

Lower-skilled adults in numeracy were more likely to be unemployed or out of the labor force than employed.
What PIAAC tells us about numeracy

Economists have found that

1. A large amount of variation in the effect of educational attainment on earnings is due to differences in skill proficiency, but the patterns differ by educational level.
   • Workers with no more than a high school diploma experience markedly higher earnings when they are proficient in literacy and numeracy.
   • A high school graduate who moves from below level 2 to level 3 in both literacy and numeracy would be expected to obtain a job that pays almost $16,000 more per year.
   • Numeracy skills are especially important for those with BA degrees

2. Older workers see the highest returns to numeracy while younger workers gain more from literacy.

3. U.S.-born workers benefit a great deal from enhanced numeracy, even after controlling for education.
Skills of Unemployed Adults by educational attainment

Over 75 percent of U.S. unemployed adults have a high school diploma or less education. About half of these adults performed at the bottom proficiency levels in numeracy.

Percentage of unemployed adults age 16 to 65 at each level of proficiency on the PIAAC numeracy scale, by highest level of educational attainment: 2012 and 2014

<table>
<thead>
<tr>
<th>United States</th>
<th>Graduate or professional degree (5)</th>
<th>Bachelor's degree (10)</th>
<th>Associate's degree (8)</th>
<th>High school credential (54)</th>
<th>Below high school (23)</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Below Level 1</td>
<td>Level 1</td>
<td>Level 2</td>
<td>Level 3</td>
<td>Level 4/5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>31</td>
<td>38</td>
<td>36</td>
<td>18</td>
<td>4</td>
</tr>
</tbody>
</table>
Skills of Incarcerated and Household Adults

U.S. Incarcerated adults score lower on average in literacy and numeracy than the average for adults in the general U.S. population.

Average scores on the PIAAC literacy and numeracy scales for adults age 16 to 74: 2012 and 2014

- **Literacy**
  - U.S. Prison: 249*
  - U.S. Household: 270

- **Numeracy**
  - U.S. Prison: 220*
  - U.S. Household: 255

* Significantly different (p < .05) from the comparison category, U.S. Household.
Skills of Incarcerated and Household Adults with low education

U.S. Incarcerated adults with less than a high school education score lower on average in numeracy than the average for adults in the general U.S. population with the same level of education.
Numeracy and Young Adults
U.S. adults in each age group, except for ages 55-65, scored below the international average for their age group in numeracy.
In numeracy, the gap in the U.S. between the youngest and oldest age band is smaller than the international average.
In the United States, growth in numeracy skills between the generations is smaller than in other countries.
Plans for 2021

1. U.S. National Sample (minimum of 5,000 completed cases, ages of 16-74)
2. State Sample - Option for direct state estimates
   ◦ Required minimum sample size of 1,000 (ages of 16-74) completed cases for each state
   ◦ Cost by state (est. in $2.7 - $3.0 million range)
   ◦ Include State results in OECD international report, the U.S. national report and website (mapping system)
   ◦ Own state-level data and report (available after release of the national report)

Timeline for State Participation
   ◦ Inform NCES of interest by January 2020
   ◦ Sign Contract with the national contractor by September 2020
U.S. PIAAC Resources

NCES PIAAC homepage
https://nces.ed.gov/surveys/piaac/index.asp

NCES PIAAC Results Portal

NCES PIAAC Data Explorer (IDE)

U.S. PIAAC Gateway
http://piaacgateway.com/

Training & Technical Support
- Online Module https://nces.ed.gov/training/datauser/index.asp#PIAAC
Thank you

For more information, please contact

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Stephen.Provasnik@ed.gov  Holly.Xie@ed.gov
What else does PIAAC tell us?
What is the impact of socio-economic backgrounds (parents’ education) on adult life outcomes
Gaps in literacy and numeracy scores by parental education are larger in the U.S. than the international average.

Note: For comparison with the international data, the U.S. data only includes adults aged 16-65. All international averages exclude Australia.
Gaps in literacy scores by nativity status are larger in the U.S. than the international average, but not in numeracy.

Note: For comparison with the international data, the U.S. data only includes adults aged 16-65. All international averages exclude Australia. For “Born in Country,” international averages exclude Austria.
What PIAAC tells us about U.S. immigrants

1. 40 percent of immigrant adults (11.5 million) versus 14 percent of the U.S.-born adults (close to 24 million) scored at Level 1 or below on English literacy.

2. Immigrants were overrepresented among low-skilled adults
   – While immigrants made up 15 percent of the total U.S. adult 16-65 population, they accounted for 33 percent of adults with low literacy skills and 24 percent of those with low numeracy skills.

3. PIAAC data indicates about a 5-point difference between the average literacy and numeracy scores for all U.S. adults and for U.S.-born adults.
Sources of health information
### Ranking of most common sources of health information for adults age 55-74, by source of information: proficiency level 3 or higher

<table>
<thead>
<tr>
<th>Source of Information</th>
<th>Radio (8)</th>
<th>Newspapers (7)</th>
<th>Magazines (6)</th>
<th>Books / Brochures (5)</th>
<th>Television (4)</th>
<th>Family / Friends (3)</th>
<th>Internet (2)</th>
<th>Health Professionals (1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage</td>
<td>33%</td>
<td>42%</td>
<td>51%</td>
<td>62%</td>
<td>63%</td>
<td>66%</td>
<td>77%</td>
<td>88%</td>
</tr>
</tbody>
</table>

- **Radio** (8): 67% (A lot" or "Some")
- **Newspapers** (7): 58% (A lot" or "Some")
- **Magazines** (6): 49% (A lot" or "Some")
- **Books / Brochures** (5): 38% (A lot" or "Some")
- **Television** (4): 37% (A lot" or "Some")
- **Family / Friends** (3): 34% (A lot" or "Some")
- **Internet** (2): 23% (A lot" or "Some")
- **Health Professionals** (1): 12% (A lot" or "Some")
Civic Participation
Compared to the international average, larger percentages of U.S. adults reported doing volunteer work.
Compared to the international average, a larger percentage of U.S. adults believe they can influence their government.
Compared to the international average, a larger percentage of U.S. adults indicated that people will take advantage of them.
PIAAC Cycle 1 Summary

1\textsuperscript{st} round U.S. Participation in PIAAC International Cycle 1: 2012
\begin{itemize}
\item Designed to produce internationally comparable and nationally representative estimates for the nation as a whole and for major population subgroups.
\end{itemize}

2\textsuperscript{nd} round U.S. National Supplement (2014)
\begin{itemize}
\item Oversampled young, unemployed, and older adults for a combined 2012/14 nationally representative sample of 8,670 adults.
\end{itemize}

3\textsuperscript{rd} round in U.S. (2017)
\begin{itemize}
\item Providing national estimates and measuring changes in adult skills over time. PIAAC 2017 national report will be released in Fall 2019.
\item Supporting state and county-level estimates of adult skills (when combined with data from 2012/14). The results will be released in Spring 2020.
\end{itemize}